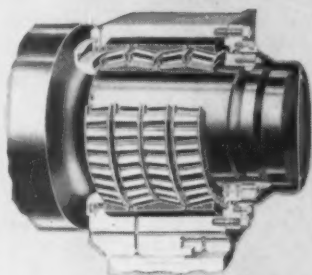


The Iron Age

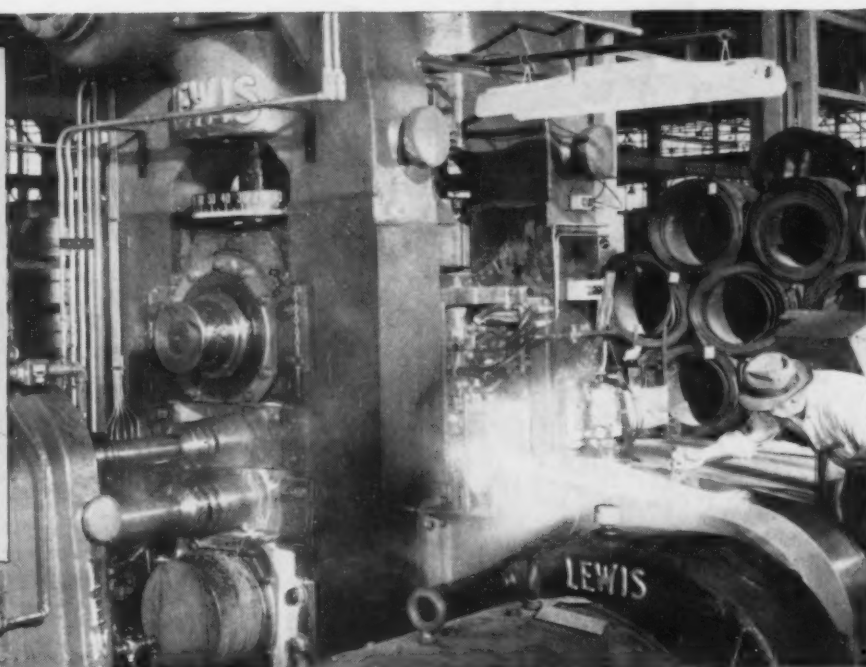
 UNIV. OF MICHIGAN
 NATIONAL METALWORKING WEEKLY

January 8, 1953

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LEWIS FOUNDRY & MACHINE CO. uses Timken bearings on the work and back-up rolls of its 4-high reversing cold strip mill. Shown above is typical Timken roll neck bearing application.



7 ways TIMKEN® bearings help Lewis strip mill strip costs

TIMKEN® bearings on the work and back-up rolls of this Lewis 4-high reversing cold strip mill cut costs 7 ways:

- 1) Timken tapered roller bearings take both radial and thrust loads in any combination. No special thrust units are required, chuck mountings are simpler and more compact, weight is minimized.
- 2) Mill can be stopped and restarted without altering or relieving screw-down pressures. Scrap loss caused by loss of gauge is eliminated.
- 3) Timken bearings have lower starting resistance, permit the mill to accelerate more rapidly. Skidding or scuffing between work and back-up rolls is reduced.
- 4) The mill can be adjusted quickly under full load at low operating speeds and while reversing rolling directions.
- 5) Timken bearings permit use of economical grease lubrication. There's no loss of lubricant during roll changes, rolls can be changed faster. Complicated lubricating systems and large oil reservoirs are eliminated.
- 6) Less leakage of lubricant with Timken bearings because closures are more efficient with grease lubrication.
- 7) Back-up rolls can be driven easier on Timken bearings. Less hydraulic accumulator pressure is needed.

Besides the 8 Timken bearings on the work and back-up rolls, a total of 14 Timken bearings are also used on the motor screwdowns, tension reels, combination drive and pinion stand of the Lewis mill. It will pay you to specify Timken bearings for all your new and existing equipment. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN
TRADE MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



*New Rotor
B-35 Vertical
Grinder with 6"
cupwheel smooths
a casting.*



*New Rotor
B-35 Vertical
Sander with 9"
pad blends welds
of machine base.*

Speed up the job with these

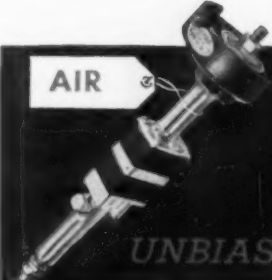
NEW ROTOR VERTICALS



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Verticals are easy
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YOU should try these new Rotor "power houses"! See how fast they remove metal. See how easy they are to handle . . . light in weight (only 10¾ lbs.) because of magnesium castings . . . comfortable balance because of adjustable handle angle.

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UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS



HIGH CYCLE

THE IRON AGE Newsfront

POWER CIRCUIT BREAKERS CAN BE CLOSED FASTER with a new hydraulically operated mechanism. A modified aircraft hydraulic accumulator is used to gain faster action. Operating parts are oil immersed for corrosion protection. Power requirements are said to be 15 pct less than for conventional methods.

AUTOMOTIVE STEEL BUYERS, among the shrewdest in their profession, will be 15 days ahead on steel quotas when controls end. Reason: They are taking full advantage of a ruling which lets them borrow on next quarter's quota 15 days before current quarter ends. They'll borrow second quarter steel in March.

STEAM TURBINES INSTEAD OF DIESEL ENGINES will power Navy transports and supply freighters. This decision by Naval brass lifts a 2-yr question mark from the Navy's propulsion program.

SECOND PROPERZI MACHINE for continuously casting aluminum rod in this country is being installed by Rome Cable Corp., Rome, N. Y. First Properzi machine to be used in aluminum industry is operating at Nicols Wire & Aluminum Co., Davenport, Iowa.

TV WILL RIDE IN STYLE AT THE INAUGURATION PARADE. Equipment usually carried in a truck will roll in a converted Cadillac limousine. Partition is being removed and equipment installed in passenger compartment. A 3-cylinder gasoline engine in the trunk compartment, specially silenced, provides ac current.

LOOK FOR 12,000 MILITARY AIRCRAFT IN '53 against 9000 last year. Biggest boosts in production will be in output of heavier combat planes, with fewer trainers and liaison planes. The industry needs 50,000 more workers (they have 750,000 now) to meet goals.

LOW CARBON SHEET STEEL CAN STAND PLENTY OF HEAT when protected by aluminum hydroxide mixed with a mill batch of ground coat enamel. Samples withstood temperatures up to 1400° F for 100 hr in recent tests. Similar steel, in tests run for AEC by Alabama University, also withstood flame impingement in which a temperature of 1620° to 1650° F was maintained for 2 hr.

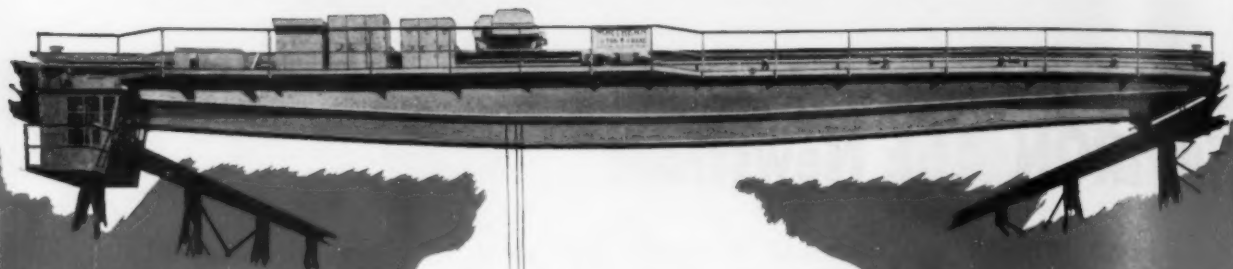
THE SWISS HAVE EMBARGOED SOME EXPORTS, BUT: In September, automatic arms worth \$620,000 and precision tools and instruments worth \$570,000 were shipped to Ethiopia, transhipped to Israel. The guns stayed put, but the tools went to Odessa, Russia. Swiss police are investigating.

MOST AUTO COMPANIES ARE REACHING UP FOR A WIDER MARKET. Chevrolet, for instance, with its new deluxe and suburban models, will cover a much wider price range than heretofore. Power steering and other optional features will make the 1953 price spread hit \$1000 to \$1200.

NICKEL SHORTAGE SHOWS NO SIGN OF EASING. Consumers foresee no break in the situation for 6 months at least, probably longer. Outlook is for continued control of nickel in steel products after regulation of other products is ended.

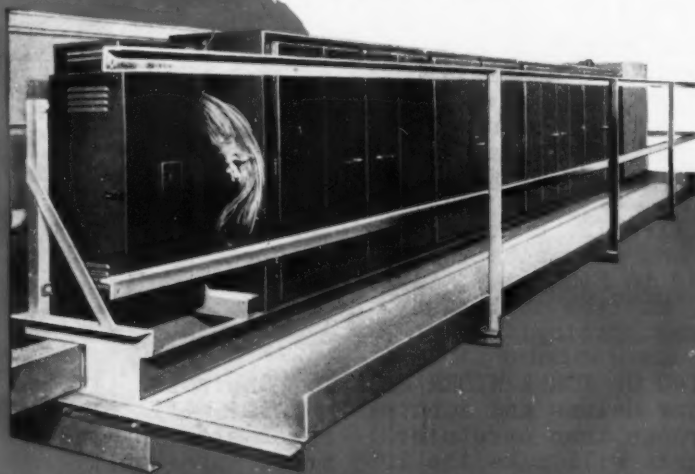
DESIGNERS ARE MAKING WIDER USE of wax models in studies of plastic flow and deformation of metals. Colored wax columns, dots or layers show what happens in forging, piercing, etc.

Northern Cranes

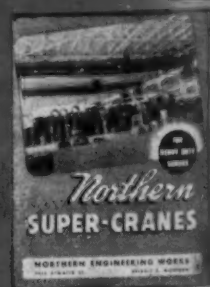


for better electrical layout

- Magnetic control panels mounted on a common support and wired as a unit greatly simplifies crane assembly, accessibility and maintenance.
- All wires, where possible, contained in metal raceways having movable covers.
- All Northern Cranes are completely wired at factory with solderless connectors, to eliminate the usual field soldering.
- Unit-welded steel construction, heavy duty roller bearings, transmission gear reductions, minimized wear on moving parts, easy accessibility, quick lubrication, simplified maintenance, and many other features reflect our experience of over 50 years in crane engineering and manufacture.



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IRON ORE: Canadian Mesabi on Last Lap

New Treasury Secretary Humphrey leaves job of delivering ore by '54 in good hands . . . Life and work continue at Quebec-Labrador project . . . How railroad's going—By Tom Campbell.

George Humphrey will have some wistful feelings this year. While he struggles with America's fiscal dilemmas as Secretary of the Treasury he will follow the progress of his colleagues in Canada's far north. They will be pulling together major parts of Quebec-Labrador's \$225 million iron ore project.

Formerly president of Iron Ore Co. of Canada, Mr. Humphrey knows every success and problem on this high grade iron ore development. He will probably itch to mix up in it again.

Ore by '54—The job of delivering iron ore by 1954 is in good hands. Genial Joe Thompson, one time banker and long time M. A. Hanna (ore, coal and steel) associate, succeeds Mr. Humphrey as president of IOCOC (operating firm for six American steel companies and three Canadian firms). Mr. Thompson is well known, liked and respected by the Canadian side of IOCOC.

Jules R. Timmins, guiding Canadian spirit behind this 1½ billion-ton iron ore find, will continue to make felt his ability to know and appreciate men's capabilities in the far north country. Mr. Timmins, president of Hollinger Consolidated Gold Mines, and Mr. Humphrey, former head of M. A. Hanna, had been associated for several years in Hollinger-Hanna Ltd., now agent for IOCOC.

The Last Lap — Hardly more than a dream less than 5 years ago (see *THE IRON*

AGE, Nov. 4, 1948, p. 155) the second Mesabi of North America is now on the home stretch. On a return trip to Knob Lake and Seven Islands a few weeks ago, this writer found projects fairly well on schedule.

Before Christmas 3000 of the 6200 workers had left the bush and camps to celebrate the holidays. They were—except for a small number who did not take to frontiers — back to work this week. It is a sure bet that ore will move down from Knob Lake to Seven Islands by August, 1954.

Two weeks ago 170 miles of roadbed north of Seven Islands was completed, while 30 miles of roadbed south of Knob Lake had

been finished some time ago. Tracks were laid up to the 115 mile mark. That trackage, with the help of a special materials handling technique, was laid in a working time of about 3 months. Average was 1½ miles a day, with 2 miles being reached on many days.

Laying Track—Under the plugging of Jack Little, manager of the Quebec North Shore and Labrador R.R., IOCOC hopes to finish the railroad, yards and spurs before weather stops work at the end of 1953. Mr. Little, ex-bushman and railroader, has been a right arm and trouble-shooter for Bill Durrell, general manager of the whole project since it started back in the late '40's.

Yards at Seven Islands terminal of the road were pretty well along. Basic dock structure was completed. To be completed this year are: rail maintenance shops, storage bins, car dumpers, underground tipples and conveyer systems.

Ore will be stocked at Seven Islands. Ships will be loaded either from stockpiles or from railroad cars at the rate of 5000 tons per hr. Shipments from Seven Islands (4 years ago a fishing village of 500 townfolk and 600 Indians: now a boom town of more than 5000) will be made during 8 months of the year.

Hydro-Power—Two large power plants will be completed this year. About 30 miles south of Knob Lake, Menihek, a 30,000-hp hydroelectric power plant, is being built. Power will come from rapids and a dam which will also serve as a bridge for the railroad across Ashuanippi



PINPOINTED: Map shows location of ore territory, progress of railroad from Seven Islands to Knob Lake, iron ore route.

Special Report

Rapids. Menihek will furnish power for mining operations, Knob Lake townsite (to have about 2500 people) and part of the railroad signal system.

It will be completed by December of this year and power will be used in mining operations in the spring of 1954.

The second power plant will be located about 20 miles northwest of Seven Islands. To be owned jointly by IOCOC and a paper company, the Margurite River power plant will furnish hydroelectric power for docks, railroad terminal, signals, airport and in and around Seven Islands. It will be completed this year.

Tractor Train—Within a few weeks a gigantic tractor train will leave mile 115 (end of the completed section of the railroad) headed for Menihek and Knob Lake. With diesel trucks, power shovels, equipment, parts and other supplies on sleds, the train will move about 3 miles an hour over the stretch of completed roadbed and further up over a tote road—a total distance of 245 miles. Those making the trip won't be on a tea party—temperatures may range between 20° to 40° below zero with snow and wind.

Quebec-Labrador iron ore fields are located about 716 air miles northeast of Montreal and about 1100 miles northeast of New York. Concessions are held in the provinces of Quebec and Labrador. A 358-mile railroad is being built from Seven Islands on the north shore of the St. Lawrence to Knob Lake directly north. Docks, yards and ore storage plant are being built at Seven Islands.

Mines and townsite will be at Knob Lake (formerly called Burnt Creek), a short distance from the boundary of Labrador at a latitude of 54° 50 min N and a longitude of 66° 50 min W. When initial concessions from the provinces are relinquished and permanent claims are taken in 1958 they will cover 300 sq miles in Quebec and 1000 sq miles in Labrador. Of this IOCOC will control 250 sq



PEN AND WRENCH: Editor Tom Campbell shown with Jock Marshall, master mechanic at Knob Lake ore mines.

miles in Quebec and 250 sq miles in Labrador. Subsidiaries of Hollinger-Hanna will control the balance of the final ore fields.

Through Sun and Snow—"Main St." at the ore camp has changed little from 4 years ago when the writer made his first trip there. Now 15 families have been there through summer and winter. (There are about 350 men in the camp area.) The 19 children attend a first class school. They enjoy the vast wilderness, the rabbit tracks, the ptarmigans and the fishing trips with their fathers on the weekend to virgin lakes.

The women folks have no tedious social obligations to meet, no traffic jams, no Joneses (yet) to keep up with. They dress



ON THE SPOT: Quickie conference is held while plane unloads at mile 134. Manager Jack Little (left) talks over excavation.

warmly in the winter and go "all out" for sledding, skiing, fishing or visiting. In the summer they are bothered by swarms of black flies. But fishing, scenery, games compensate for fly bites.

Before ore moves down from Knob Lake to Seven Islands in August 1954 C. E. (Mac) MacManus will have close to a million tons stocked ready for the cars. An old hand at open pit mining, Mac and his men will further outline future operations.

Hardy Dwellers—Life at Seven Islands will be normal for those inured to cold weather and snow. Those who will live at Knob Lake the year round will of necessity be the hard-to-beat and rugged pioneer types. Summer there, except for flies and mosquitoes (which will be licked later by chemicals), is temperate. Winter temperatures can and do reach 59° below with 30 to 55 mile winds and 3 to 4 ft of snow.

Along the route beyond mile 115 (point to which tracks are laid) on to Knob Lake, 358 miles north of Seven Islands, hundreds of workers must be clothed, fed and furnished with tools. At the mining camp 350 men and 15 families had to be completely sustained where nothing is grown and where no trains now run. How was it done? By one of the biggest civilian air lifts in history.

Everything in the beginning was flown in day and night—food, shovels, jeeps, tractors, people, cement and hundreds of items. Last week Hollinger Ungava Transport—the air arm of the ore project — under the direction of Charlie Hoyt was still flying in material and people. It moved about 3000 men out of the bush and Seven Islands for the holidays. Charlie Hoyt's boys flew 16,810 hr in 1952 and HUT handled 5,750,000 ton-miles of cargo at a cost still below 40¢ per ton-mile—a figure some American air express people envy.

Shipment Rate — During the first year of mining about 2½

CANNING: Dual-Plate Gains Favor

It took less than 2 years for dual-coated tinplate to be accepted . . . It saves 35 pct of tin, cuts cost 30¢ per base box . . . Electrolytic pushing hot-dip out—By J. B. Delaney.

Less than 2 years after its public debut, differentially-coated tinplate appears to have won acceptance into the canmaking family.

To tinplate producers and consumers the significance is threefold: (1) It marks an important refinement of the electrolytic process in that it is one of the first applications to sanitary packs in which electrolytic is being used without protective lacquer, (2) It means a reduction in cost, and (3) It means reduced consumption of strategic tin.

This newest product of the electrolytic lines firmly established itself during 1952 on the basis of commercial test packs, primarily of tomato juices. In these tests, a coating weight of 1 lb was used for interior of the can and 0.25 lb. for the exterior.

For such packs, a hot-dipped product with a coating of 1.25 lb on both sides of the plate formerly was used. The dual-coated plate will mean a reduction of about 35 pct in tin consumption, and a cost saving of 30¢ per base box to the consumer who formerly used the 1.25-lb hot-dipped plate.

Hot-Dip Skidding—The advent of differentially-coated plate strikes another blow at the hot-dipped product, which has been steadily

Production of Tinplate

Year	(Net Tons)	
	Hot-Dipped	Electrolytic
1951	1,566,199	2,874,851
1950	1,861,253	2,718,023
1949	1,659,933	2,060,584
1948	1,869,778	1,956,539
1947	1,891,656	1,772,088
1946	1,731,500	896,323
1945	1,726,797	873,470
1944	1,784,135	647,252

Source—AISI

losing ground to electrolytic since 1943. Some observers believe hot-dipped consumption eventually will fade to insignificant tonnages for highly-specialized purposes.

From a technological standpoint, producers feel that differentially-coated plate is a milestone marking a shift of emphasis from improvement of electrolytic equipment to refinement of coating techniques.

The industry is forecasting a consumption of more than 2 million base boxes of dual-coated plate in 1953. This would approximately quadruple last year's consumption when the 2-month steel strike hampered output of tinplate mills. Sizeable orders for 1953 delivery have been placed, and more can makers are expected to swing over

to the product during the year.

Troubles — Producing a 1-lb coating on electrolytic lines where the former maximum was 0.75 lb was not without its problems. Chief of these was the necessity of reducing speed of the line so that the heavier coating could be deposited.

While the differentially-coated product can be made on all electrolytic lines, certain types of lines are more adaptable to the process, particularly some of the newer lines installed during the last several years.

Another problem of dual-coating was to establish a sure method of distinguishing between the light and heavy coatings of the plate. This was licked by adopting a dull matte finish for one side of the product.

Feel the Way—Bulk of the differentially-coated tinplate expected to be produced this year will be made over a 6 to 8-month period beginning late in first quarter. It will be used primarily for tomato juices, whole tomatoes and certain soups. Its success this year will largely determine consumption during 1954.

The industry is confident consumption will continue to grow. For one, it is felt the product has large potentialities which have not yet been exploited. Producers visualize its use in the packing of certain fruits and possibly many citrus products. While its use has been limited thus far to domestic consumption, some foreign orders have been received.

Special Report

million tons of ore with 57 to 60 pct Fe will be moved; in the second year shipments will reach 6 million tons; in the third year the immediate goal of 10 million tons will be reached—and eventually tonnage will rise to 20 million tons or more a year.

The ore will find its way to Buffalo, Cleveland, Youngstown, Wheeling, Weirton, W. Va., Butler, Pa., Middletown, Ohio, Ash-

land, Ky., Detroit, Sparrows Point, Md., Bethlehem, Canada, England.

It will move by ship out of Seven Islands to the Great Lakes—to be unloaded at Montreal, transported by train or barge about 100 miles and reloaded onto lake vessels. The ore will leave lower lake ports by train to inland plants. When Canada finishes the St. Lawrence seaway ore boats will go directly to the Great Lakes.

At least one major railroad may make an attractive rail rate south from Montreal. Regardless of transportation costs this ore will be competitive with American iron ore.

In 10 more years Canada—the frontier and mineral stockhouse of the North American continent—will have a new Mesabi bonanza with iron ore tonnage limited only by rail capacity.

BUSINESS: Fast Pace Through 1954

Commerce Dept. circles 1955 as questionable . . . Backlog of DO appropriation will have been used up . . . Expansion of private markets must start to offset slump—By A. K. Rannels.

From 1951 through 1953, American industry will have invested roughly \$80 billion for expansion, including new plants, new equipment, and replacement of old and obsolete facilities.

Basic iron and steel facilities expansion accounts for more than \$5 billion, automotive facilities for another \$2.7 billion, and machinery and other metalworking expansion for \$6 billion.

Big question is: What are the prospects for keeping these facilities producing at this level during the next few years?

Safe In '53—Virtually all metalworking and durable goods industries can expect high business levels to continue through 1953 and probably during most of 1954. But 1955 could—but need not be a slack year.

This is because defense and industrial expansion spending will have taken a downturn with that year. The slack will have to be taken up by increased effort on the part of industry and business to spur sales of end items to the consumer.

Such are the conclusions of the Commerce Dept. in its report *Markets After Defense Expansion*. The 6-month study was made by leading economists in government and industry.

Aggressiveness—The report recognizes the "real possibility" of a business drop beginning with 1955. But it emphasizes that what happens will depend to a large extent on "business aggressiveness . . . to expand private markets."

Under the spur of defense mobilization, industry-business output has reached a level of about \$350 billion in gross national product. Government procurement—federal, state, and local—now accounts for nearly one-third of it.

Early in January, Congress will begin a review of the military and defense program. Any changes made will make a difference in industrial and business trends, but not immediately. Regardless of congressional action this year, there will be little change in governmental expenditures for another 2 years.

Spending Lag—Reason is that a substantial portion of money already appropriated has not yet been spent. Congress has earmarked around \$208 billion for military and defense purposes since Korea. As of Jan. 1, about \$110 billion was still available for spending, enough for 2 calendar years at the current rate of spending.

Nevertheless, defense expenditures must be expected to drop off—from \$5 billion-to-\$10 billion for 1955, perhaps more if the current and succeeding Congresses cut the "fat" from military programs. Industrial expenditures for expansion will drop, beginning with 1954. Slack must be taken up by other market outlets.

This is of special interest to the steel and metalworking industries. Ingot capacity is now 116 million

tons and the Office of Defense Mobilization expects it to go above 120 million tons by the end of 1953. Even if the military take should continue at present levels, this would leave more than 105 million tons for non-defense purposes.

Auto Demand—In looking ahead to 1955, the Commerce Dept. expects normal demand for automobiles to be at least 5 million vehicles a year, providing the national economy is still at the 1952 levels. This would eat up substantial amounts of steel.

Increasing traffic is counted as increasing need for expanded highway construction. The post-war level of highway expenditure has remained relatively constant. Best estimates of the Bureau of Public Roads and non-government groups indicate that about \$30 billion needs to be spent on highways.

Farm Mechanization—Increased mechanization of farms is viewed as providing an expanding market. Farm equipment expenditures during 1951, considered below actual requirements, amounted to more than \$3 billion. Of this amount, \$1 billion was invested in tractors and \$2 billion in other types of machinery and implements.

In the industrial field, expansion activity is tapering off. But other types of construction have generally been starved for structural steel since the beginning of 1951.

Construction—Present expenditure rate for all construction is running more than \$30 billion a year. Residential construction is topping \$11 billion.

Expanding residential and commercial construction has bolstered the market for appliances. Furniture markets have also been expanding.

It is indicated that the consuming public's disposable income would run around \$240-to-\$250 billion. The Commerce Dept. report indicates that with continued high employment and present wage levels, it should be from 5-to-7 per cent better by 1955.



NICKEL: Boost May Hit Alloy Prices

Inco files for 3½¢ per lb price boost . . . OPS must turn the other cheek . . . Similar to newsprint hike . . . Impact would be felt on stainless, alloy steels—By R. L. Hatschek.

The U. S. buck just isn't what it used to be. That's the reason International Nickel Co. of Canada has asked a price hike of 3½¢ per lb for nickel. The company claims its profits are cut because of the lower value of the American dollar as compared to its Canadian counterpart.

An increase in nickel prices would have an impact on costs of producing many stainless and alloy steels, nonferrous alloys, special cast irons, and high-temperature materials. Present government policy is to permit producers to pass through such increases in the form of higher prices.

Washington's price controllers don't like it—but they can't do a thing about it. Inco has filed its request with Ottawa but, so far, there has been no indication of approval or disapproval. Right now the decision is left to Canada's Minister of the Interior.

Not First Time—A parallel case was that of newsprint. Last spring the Canadian producers indicated the need for an increase. The U. S. objected but the price went up anyway. They had a good case for the boost. Another parallel, this one in metals, was the elimination of the copper import ceiling resulting from Chilean dissatisfaction with U. S. prices.

Most observers believe the nickel increase will be okayed, their only doubt being the effective date. It would bring the delivered New York quotation for electrolytic nickel to 63.08¢ a lb.

Inco is the world's leading producer of the metal with an annual capacity of approximately 125,000 tons. Total Canadian output in 1952 was about 140,000 tons. Reactivated facilities at Nicaro, Cuba, produced 8956 tons of nickel in 1952 but are now producing at

a near-capacity rate of some 15,000 tons annually. Domestic production is relatively negligible.

Use 96,000 Tons—U. S. consumption in the year just ended totaled an estimated 96,000 tons, most of which originated in Canada. Of the total, some 40,000 tons went into stainless and alloy steel, 31,000 tons went into nonferrous alloys, 7800 tons went into high-temperature and resistance alloys, and 17,600 tons went for other purposes such as cast iron alloying and plating.

Nickel is still on the government's ever-diminishing list of critically short materials. It has become increasingly more important in modern warfare, particularly in this age of jet planes which require much nickel for high-temperature parts.

International Materials Conference is allocating only four items for the first quarter—nickel, molybdenum, copper and sulfur. Continuation of sulfur allocation is only to confirm that supplies are adequate and copper allocations are to be reviewed at the end of

the month with a view to discontinuing them. This adds emphasis to the short nickel supply.

Stainless Impact — A 3½¢ increase in nickel prices, if passed along, would mean an increase of about \$5.60 a ton for 18-8 type stainless steels. This might well give a further boost to the new 16 pct chrome, 16 pct manganese, 1 pct nickel type of stainless, though the price picture of the latter is still very hazy (See THE IRON AGE, Jan. 1, 1953, p. 227).

A price increase of 2½¢ per lb was granted in mid-December for nickel and Monel mill products produced at Inco's Huntingdon, W. Va., plant. This was attributed to increased costs at the mill and came shortly after a retroactive wage hike. Whether any new increase would be passed along is largely up to OPS.

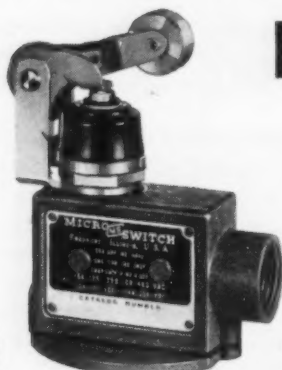
The price increase on mill products was permitted after an OPS earnings standard study which reportedly showed Inco was eligible for a 3.44¢ increase. But OPS would go no higher than 2.5¢ per lb. Knowing that OPS could do no more than protest, the company then decided to get its due by increasing basic metal prices, it's said. The price agency is staying mum on chances of a protest.

Last increase in primary nickel prices came on June 2, 1951, when Inco raised them by 6¢ per lb.

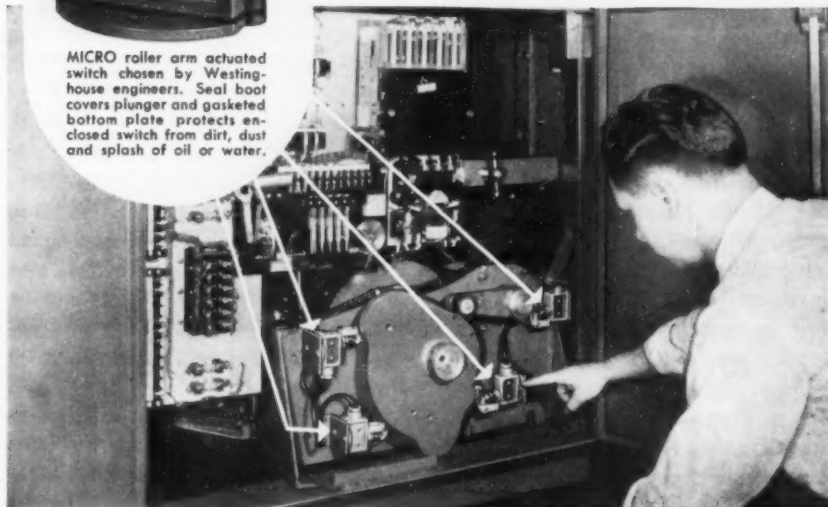


RUBBER ROAD: B. F. Goodrich Co. has proposed plans for a \$6 million rubber beltroad to carry iron ore and limestone from harbor to industry in Cleveland's Cuyahoga Valley. The beltroad, which would resemble the drawing above, might solve Cleveland's multi-million dollar problem of keeping the Cuyahoga River open for ore boat traffic.

Westinghouse...aided by MICRO... brings new efficiency to automatic gear hardening



MICRO roller arm actuated switch chosen by Westinghouse engineers. Seal boot covers plunger and gasketed bottom plate protects enclosed switch from dirt, dust and splash of oil or water.



So speedy and efficient is this Westinghouse INDUCTALL gear hardening machine that a battery of five of them is capable of heat-treating up to 300 gears an hour.

For automatic control of the vital handling, heating, quenching and unloading, Westinghouse selected four MICRO precision switches. This selection was prompted by their precise, long-life, trouble-free performance, ease of mounting and water-tight connections provided.

Choice of MICRO switches as components for this rugged machine tool is typical of the confidence placed in MICRO design and performance by design engineers throughout the machine tool industry.

MICRO field engineers, with wide experience in the switch requirements of machine tool design, are located near you. They are ready and willing to assist in the selection of the MICRO switch best suited to your specific requirements... or help in the development of an entirely new switch if this is indicated. Write or call your nearest MICRO branch office.

Westinghouse engineer points to one of four MICRO precision switches which are operated by cams to provide completely automatic operation of the handling, heating, quenching and unloading of gears in the Westinghouse INDUCTALL gear hardening machine.



Exterior view of Westinghouse INDUCTALL gear hardening machine which shows the clean, compact design of this modern machine tool for mass-production gear hardening.

MICRO

MAKERS OF PRECISION SWITCHES
FREEPORT, ILLINOIS

A DIVISION OF
MINNEAPOLIS-HONEYWELL REGULATOR COMPANY



Management

PENSIONS:

Checks may not cover living costs . . . Progress reported.

Half a pension may be better than none but many of the 90 out of every 100 American workers who will get some sort of retirement pension will discover when they open the mailbox that the checks won't fully defray their living costs.

The recent survey indicating this was conducted by the Independent National Planning Assn. for the Senate-House Committee on the Economic Report. A principal conclusion drawn by NPA is that much remains to be done in pension plan improvement despite substantial pension progress in the past 15 years.

Primarily the survey is an analysis of government and private pension plans, furnishing examples of social security payments considered inadequate and criticizing the lack of more liberal provisions for widows and permanently disabled workers, whose expenses are naturally high.

Pension Amount—According to the study, a single man earning about \$250 per month, described as the average wage in heavy industry, would get only \$77.50 per month in social security benefits. A married man whose wife has reached age 65 would get \$116.30 per month from all sources upon retirement.

Fewer than 25 pct of the 3.5 million non-working widows over 65 are receiving pensions, the survey reports.

In general, however, researchers find there has been progress in the past 15 years toward providing some income for retiring workers other than personal savings. Only about 15 pct of employees in private and government employment were covered by retirement systems in 1937, while the figure now is approximately 90 pct. One out of five persons under federal social security also is included in some form of private pension plan, the survey shows.

PRESSES: New Design For Giants

Throatless design for 75,000-ton press eliminates support columns, tie rods . . . Permits better accessibility, improved materials handling . . . Not too tough to build—By R. M. Lorz.

An interesting new concept in heavy press design may eventually pave the way for economical construction of 300,000-ton giants with existing machine tool and foundry capacity.

Scale model of a proposed 75,000-ton throatless forging press was unveiled in Cleveland last week, and first viewers were amazed at simplicity of the proposed "design."

If planners can get into actual production U. S. could have a press four times as large as the biggest now operating in the Free World and twice as large as the German press the Russians are said to be operating behind the Iron Curtain.

Basically the new press design is advanced as a practical application of a theory stemming from the effect produced by direct opposition of equal forces. In this case theory would emerge as a monolithic concrete structure capable of supporting and suspending a 75,000-ton hydraulic press. Its designers say it would present no construction problem more formidable than normal pre-stressed concrete technique.

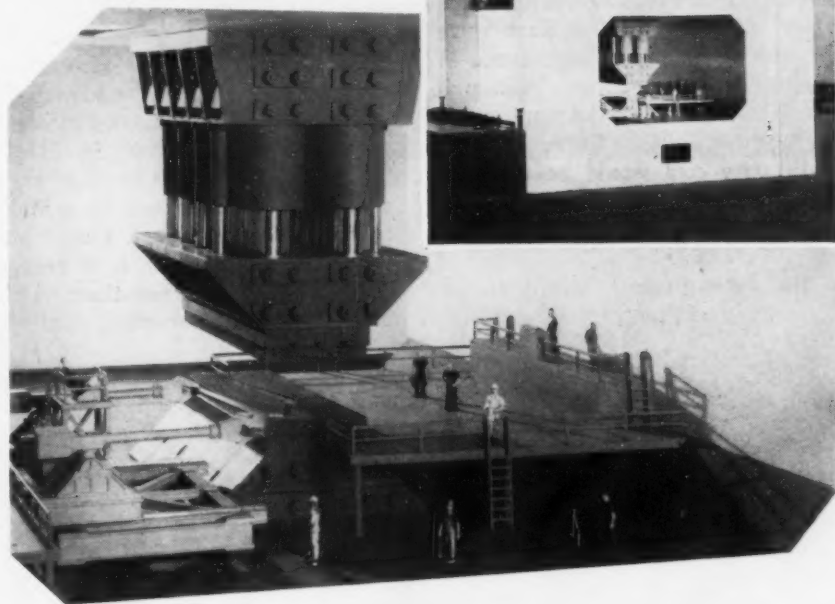
Even Bigger — Although attention has so far been focused on the 75,000-ton model, officials of the newly formed Throatless Press Co. say much heavier presses can be built by increasing size of the housing structure. Design would also permit multiple installation of smaller presses with the option of increasing capacity.

New press design is well named since throatless feature gives ready access to working area. By eliminating support columns and huge tie rods found on conventional models, designers have blue-printed a press which will provide 360 degree access to the press platen.

The additional working space would greatly simplify materials handling and die changing and would give pressure processors more latitude in setting up restraining shapes.

Easier to Build — Perplexing problems in transportation and machining might also be solved because the new design does not include a single press component larger than the head of a 13,000-ton German extrusion press.

Idea was originally conceived by



MASSIVE: Insert shows exterior of scale model of proposed monolithic concrete frame with press head attached to ceiling. Large picture shows model of press with 360° access.

engineer C. A. Van Dusen who gave full development rights to The Austin Co., Cleveland and The Hydraulic Press Co., Mt. Gilead, Ohio.

These two firms recently formed Throatless Press Co. and have applied for patent rights.

Interest in heavy presses in this country has recently crystallized around the Air Force heavy press

program. This vast program of engineering design, procurement and construction is already well underway. It calls for design, building and erection of 17 hydraulic forging and extrusion presses and auxiliary equipment at an estimated cost of close to \$500 million.

Scope of Program — Of these, eight are die-forging presses with capacities of 25,000, 35,000 and 50,000 tons; and nine are horizontal extrusion presses with capacities of 8000, 12,000 and 20,000 tons (IRON AGE, Apr. 3, 1952, p. 85).

This is not the first design for a 75,000-ton press advanced in this country. The Munitions Board originally advocated building of a 75,000-ton Goliath designed by Loewy Construction Co., New York (THE IRON AGE, Jan. 18, 1951). The Loewy design, while differing widely from the largest presses now in use, was less radical than the blueprint revealed last week.

MANGANESE: Retrieved from Steel Slag

Mangaslag to build Coxton, Pa., plant to recover manganese from openhearth slag . . . Will use Bureau of Mines process . . . 1000 tons a month . . . Gets loan and contract from DMPA.

Manganese extracted from slag is to become available—finally—this year on a commercial basis. Mangaslag, Inc., headquarters Fort Worth, Tex., which last week signed a \$1,250,000 contract with Defense Materials Procurement Agency, expects to be producing at least 1000 long tons of ferromanganese monthly early in '54 at a plant to be built at Coxton, Luzerne County, Pa.

In reporting four processes being simultaneously developed in America to retrieve manganese from openhearth slag, THE IRON AGE in its Dec. 6, 1951 issue said DMPA "is likely to act favorably" on a contract to Mangaslag. At that time steel interests in the East were lending technological assistance to the tentative company. Although IRON AGE mentioned the plant might be built at Wilkes-Barre because anthracite coal would be used instead of coke, final plans put it in nearby Coxton—the same county.

Big Pilot Plant—Output of the new plant will be sold either to in-

dustry or to the government under certain purchase options, according to Jess Larson, DMPA administrator. Primary purpose of the plant is to prove the commercial feasibility of the new recovery process, Larson says, but he then points out that a production rate of "at least" 1000 long tons of ferromanganese per month is anticipated. He describes the new operation as "a sizable pilot plant."

DMPA states that Mangaslag has leased from the Lehigh Valley Railroad the land necessary for plant operations, and has agreements with "major steel companies" for obtaining supplies of slag.

Features of Loan—Mangaslag, under its government contract, is to supply the first \$250,000 in costs of providing the new facilities. Thereafter, DMPA is to make cash advances, not to exceed \$1 million to complete the project. Money advanced from this fund is to bear 4 pct annual interest, and the government is to retain certain controls

over the company until repayment.

Larson says if the Coxton plant is successful — economically and technologically — Mangaslag will then undertake construction at its own expense and without government assistance of several commercial plants with at least 10 times the capacity of the pilot plant.

It is estimated that more than 500,000 tons of metallic manganese is now lost annually in steelmaking operations.

Started in Pittsburgh—Mangaslag's process has been developed over a period of years under the direction of P. H. Royster, assistant to the chief metallurgist of the U. S. Bureau of Mines. And a small pilot plant operated by the Bureau at Pittsburgh now shows "sufficient promise" to justify operations on a larger scale.

Operating at the Bureau's Pittsburgh station was a pygmy blast furnace which smelted high-manganese slag resulting from openhearth operations on Mesabi Range ore. The resultant spiegel containing from 20 to 24 pct manganese was processed in a Bessemer basic acid converter.

A slag charge already in the converter acting as a "sponge" retrieved the oxidized manganese as it was released from the melting spiegel. The "sponge" material (or cinder or synthetic manganese ore) then got further treatment in a ferromanganese furnace to yield 80 pct ferromanganese.

No End Seen—THE IRON AGE was told last week that adoption of this one manganese-from-slag process does not mark end of research on the three other methods this magazine reported some time ago. These will be continued.

Commenting on the Coxton contract, Larson says:

"Several factors entered into the selection of the Coxton site for the pilot plant. The ready availability of materials to be processed and of anthracite coal needed to produce the high temperatures employed in the recovery process were prime considerations. Availability and cost of power and water and facilities for waste disposal were others."



CZECH MILL: Treasury Dept. has authorized General Public Warehouse Co., Phila., to sell Farrel roll grinders, part of the rolling mill built for Red-dominated Czechoslovakia, at public auction on Jan. 15. Since the U. S. blocked shipment of mill Czechs let \$80,000 worth of storage charges pile up. Four separate custodians are storing mill parts but only one company has asked license to sell parts in compensation for storage. Treasury would like to see mill go to friendly user who will offer to buy mill from Czech owners. Money would still go into blocked account.

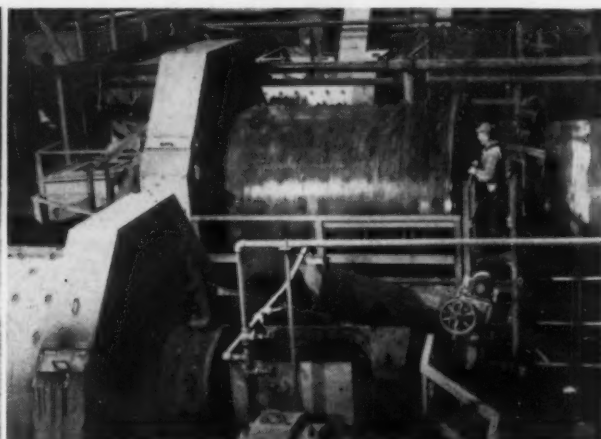
New York Iron Ore Mines Expanding

Jones & Laughlin Steel Corp.'s Benson Mines in upper New York State, nearing completion of a \$7.5 million expansion program, will provide more than 1.3 million tons of ore concentrates for company operations in 1953.

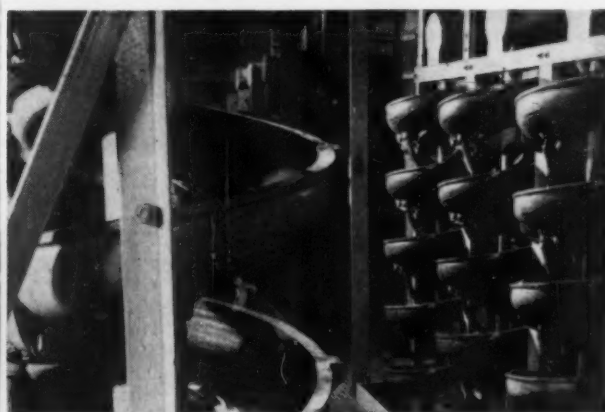
In the next 3 to 4 years the company proposes to expand production to 1.9 million tons annually. Of

this total approximately 560,000 tons would be martite ore, the balance magnetite. Due to last summer's strike, production this year was limited to 1 million tons instead of an expected 1.3 million tons. In 1944 the development produced 360,000 tons.

The martite concentrate analyzes about 64 pct Fe, while the magnetite averages around 62 pct.



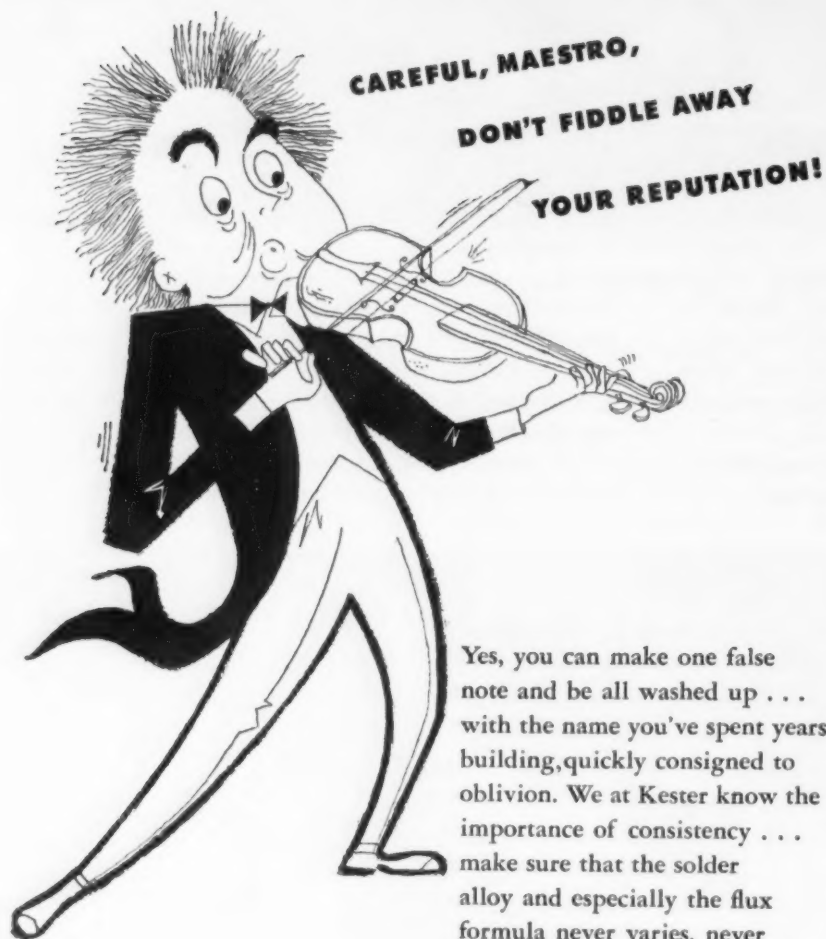
Battery of ball mills $\frac{3}{8}$ in. to 20 mesh. Separators are next step.



Ore is crushed in 54-in. primary gyratory crusher down to —8-in. Humphreys spirals remove non-magnetic martite ore by gravity.

Unusual sintering line eliminates water quench by means of extended air cooling bed. Sinter leaves bed at 400°F, but J&L hopes to cut this to 200°.





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—International—

INDIA: Steel Loan

World Bank's \$31.5 million iron, steel expansion loan will bolster economy, agriculture.

Underpinning of India's second 5-year economic development plan has been bolstered considerably by a recent \$31.5 million loan from the World Bank. Loan will be used to snowball a major expansion of India's iron and steel industry.

Recipient of the loan is Indian Iron & Steel Co. in West Bengal. The new financing will be used to expand IISCO's blast furnace capacity from 640,000 tons to 1.4 million tons per year. Company's finished steel output is expected to jump from 350,000 tons to 700,000 tons per year.

Completion of the expansion program should just about double India's iron output and raise steel production by one-third.

Food Shortage — Need to increase India's capacity is critical because iron and steel are the marrow of plans to relieve the country's pressing food shortage. Large amounts of iron are needed for the manufacture of plows and other farm implements. Steel is in demand for construction of large irrigation and flood-control works designed to increase agricultural output. It is also required for extension of rail lines, to build hydroelectric works, to furnish power for industry in rural areas, and for new housing.

Demand for steel is already considerably greater than domestic production and as a result much has to be imported. But surprisingly, India is potentially a good producer. The country has rich deposits of iron ore, coal, manganese and limestone. Labor is plentiful and the wage scale low.

Modernization — IISCO, which has taken over the Steel Corp. of Bengal, Ltd., will use the \$31.5 million loan to expand integrated facilities at Burnpur, to modernize its iron plant at Kulti, and to expand and mechanize operation of

Means More Food

the company's iron mines at Gua.

At Burnpur, the company will put in two new batteries of 78 coke ovens each. An obsolete 40-oven battery will be removed and two new blast furnaces, each with a daily output of 1200 tons of iron will be installed. Steelmaking facilities will be increased by the addition of a third 25-ton Bessemer converter. Finishing departments in the rolling mills will be expanded for additional tonnage.

Tannin Cuts Rust on Roman Tools

Examination of 2000-year-old Roman tools may lead to a new method of protecting underground pipes from corrosion. The tools were unearthed recently during excavations at a site in Hungate, York, England. Although they had been buried in highly corrosive soil, the implements were found to be in almost perfect condition.

Tannates in the soil are believed to have prevented action by sulphate reducing bacteria which usually cause rapid corrosion in waterlogged clay soils. Since many leather cuttings and several medieval shoes were found during the digging, the area is thought to have been the center of a leather industry in the Middle Ages. Tannin from the leather deposits is thought to have prevented normal corrosion.

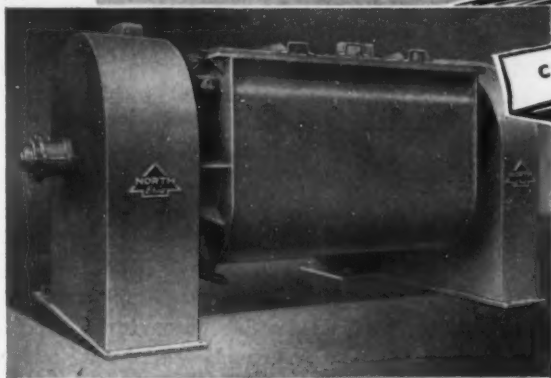
Scrapings from a Roman knife were examined chemically, and it was discovered that there were traces of tannate in the little surface corrosion that existed. Cultures were then made of sulphate reducing bacteria and inoculated with soil from the site. It was found that the bacteria were made inactive if more than 5 pct of the soil were added.

Later work has shown that tannic acid in concentrations of more than 0.01 pct stops the action of sulphate reducing bacteria. This discovery may result in a new method of protecting underground pipes from corrosion.

NORTH ERIE • NORTH ERIE • NORTH ERIE • NORTH ERIE • NORTH ERIE

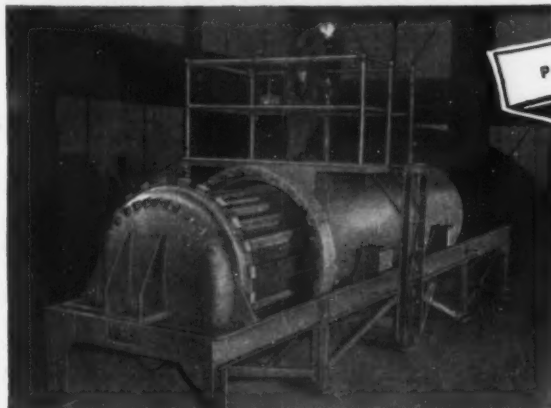
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DECONTROL: House Puts on Heat

Small Business Committee urges junking of CMP, other curbs . . . But Fowler argues for extension . . . House group charges agency bungling wrecked stabilization, hurt small business.

Some highly efficient fuel was thrown on the fire under controls agencies when the House Small Business Committee last week came out for elimination of wage, price and materials controls as soon as possible.

These have outlived their usefulness and should be ended, the group charged in its year-end report. Controlled Materials Plan should be replaced at the end of this quarter by a system of directives to ensure meeting of military and atomic energy needs, the committee said.

The statement was especially dis-

heartening to controls officials since the House group had been a strong advocate of the stabilization program in the early days of mobilization. But the unkindest cut was the committee's charge that agency incompetence had wrecked the program, hurt small business.

Timing — The blast came just after Mobilizer Henry H. Fowler had made his latest pitch for extension of controls legislation. In his latest (8th) quarterly report to the White House, Mr. Fowler said last week that defense mobilization is at the half-way mark. The

distance left to go, he said, means that varied degrees of production and wage-price controls will be needed throughout 1953. "There is no question, but that powers in the Defense Production Act for priorities and allocations, and for expansion of production, will need to be continued beyond the expiration date of June 30."

And as for price-wage controls, he said, the form and degree to which they should be continued would have to be decided by spring. "But," he declared, "it would be unwise at this time to plan to drop them on Apr. 30 when present legislative authority expires."

Military production has increased seven-fold, and deliveries are now at the \$8 billion-a-quarter rate. Production of many items have reached the level at which they will be maintained.

May Ease — Steel capacity is now at the 116,000,000-ton rate, the report states. It should reach the 123,000,000-ton mark by the end of this year. Big problem now seen is shortages in selected finishing capacities.

It might be possible during second quarter to "open-end" CMP insofar as steel is concerned, Fowler says. It might even be possible to remove all controls except military priorities sometime during second half 1953. But, he maintains, extension of broad controls is necessary for use "only when absolutely needed."

National Production Authority last week estimated that 31 pct more steel would be available for civilian manufacturing in 1953 than in 1952. Defense Dept. & Atomic Energy Commission needs will run about 14 million ingot-tons, leaving about 104 million tons "available for other uses."

Not So Good — Aluminum and copper outlook is not so optimistic as for steel. An aluminum expansion goal of 1 million tons a year has been set. It is well under way. But the supply outlook for 1953 is not so good.

Power shortages are currently cutting back production by existing

STEEL: Finished Shipments High in October

As Reported to the American Iron and Steel Institute

STEEL PRODUCTS	CURRENT MONTH					TO DATE THIS YEAR				
	Carbon	Alloy	Stainless	Total	Pct of Total Shipments	Carbon	Alloy	Stainless	Total	Pct of Total Shipments
Ingot	100,972	26,957	2,495	130,424	1.8	618,536	214,647	15,879	849,062	1.6
Blooms, slabs, billets, tube rounds, sheet bars, etc.	187,984	56,259	2,228	246,471	3.4	*1,386,106	427,384	14,995	*1,828,485	3.4
Skelp	12,722			12,722	0.2	85,153			85,153	0.1
Wire rods	81,550	2,415	724	84,689	1.2	564,250	12,997	4,936	582,183	1.1
Structural shapes	404,142	8,155	14	412,311	5.8	3,241,175	58,953	73	3,300,201	6.1
Steel piling	19,570			19,570	0.3	180,297			180,297	0.3
Plates	668,139	38,025	2,935	709,099	9.9	*5,299,997	286,300	21,735	*5,608,032	10.3
Rails—standard	144,543	18		144,561	2.0	1,064,229	164		1,064,393	2.0
Rails—all other	11,337	7		11,344	0.2	91,498	60		91,558	0.2
Joint bars	11,946			11,946	0.2	90,772			90,772	0.2
Tie plates	39,806			39,806	0.6	304,562			304,562	0.6
Track spikes	10,831			10,831	0.1	81,126			81,126	0.1
Wheels	32,077	110		32,187	0.4	273,596	770		274,366	0.5
Axles	18,393	9		18,402	0.3	131,133	174		131,327	0.2
Bars—hot rolled	616,375	224,413	5,893	846,678	11.8	4,796,479	1,583,167	38,521	6,418,167	11.8
Bars—reinforcing	197,465			197,465	2.8	1,448,830			1,448,830	2.7
Bars—cold finished	166,304	33,212	5,616	205,132	2.9	1,236,302	294,752	40,149	1,541,203	2.8
Tool steel	1,799	8,535		10,334	0.1	17,049	85,097		102,146	0.2
Standard pipe	257,134	33		257,168	3.6	1,932,778	271		1,933,061	3.6
Oil country goods	151,177	14,608		165,785	2.3	1,162,002	120,150	12	1,282,152	2.4
Line pipe	292,230	6		292,236	4.1	2,328,144	172		2,328,316	4.3
Mechanical tubing	73,547	25,995	666	100,208	1.4	539,696	*216,199	5,589	*761,484	1.4
Pressure tubing	39,856	4,624	1,542	46,022	0.6	293,851	31,775	10,150	335,776	0.6
Wire—drawn	273,424	6,850	3,527	283,801	4.0	2,028,496	45,553	23,944	2,097,993	3.9
Wire—nails, staples	68,215			68,215	1.0	546,227		20	546,247	1.0
Wire—barbed, twisted	26,900			26,900	0.4	197,657			197,657	0.4
Wire—woven fence	31,377			31,377	0.4	286,322			286,322	0.5
Wire—bale ties	2,331			2,331		54,825			54,825	0.1
Blackplate	86,927			86,927	1.2	724,791			724,791	1.3
Tin & ternoplate—hot dipped	142,062			142,062	2.0	1,111,805			1,111,805	2.0
Tin plate—electrolytic	293,222			293,222	4.1	2,310,373			2,310,373	4.3
Sheets—hot rolled	599,832	36,470	2,272	638,574	8.9	*4,632,012	192,515	21,182	*4,845,709	8.9
Sheets—cold rolled	836,245	11,809	12,251	860,305	12.0	6,153,795	67,232	84,966	6,305,993	11.6
Sheets—galvanized	219,883			219,883	3.1	1,558,255			1,558,255	2.9
Sheets—other coated	18,952			18,952	0.3	168,427			168,427	0.3
Sheets—enameling	14,153			14,153	0.2	117,779			117,779	0.2
Electrical sheets, strip	11,927	55,567		67,494	0.9	69,915	410,002		479,917	0.9
Strip—hot rolled	201,635	5,462	287	207,384	2.9	1,415,530	29,193	*2,791	*1,447,514	2.7
Strip—cold rolled	169,802	2,057	16,981	188,840	2.6	1,241,245	16,726	111,385	1,369,356	2.6
TOTAL	6,536,786	561,593	57,232	7,155,611	100.0	*49,784,035	*4,064,253	*396,327	*54,244,615	100.0

During 1951 the companies included above represented 98.5 pct of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Revised.

Controls

facilities by 55,000 tons quarterly. But the rate of output is expected to increase from the present 345,000 tons to about 440,000 tons for the third and last quarters.

Supply of copper products for 1953 are estimated at about 2.6 million tons, as against 2.45 million tons for 1952. Some additional production is expected to come in during 1954, but several of the larger developments will not be completed before 1955.

Fewer Cars — Steel shortages plus the steel strike set the freight car program back considerably, the report notes. This meant that 1952 output amounted to only about 75,000 units, even fewer than in 1951. The ODM hopes the production rate will be back up to 9000 a month by June.

The Fowler report also concludes that (except for "elephant" and a few other highly specialized tools) the machine tool bottleneck has been largely overcome. Shipments have quadrupled since Korea, it is noted. The overall backlog, at a peak of 23 months in 1951, has been worked down to 10 months.

As a result of nearly always meeting military materials requirements and breaking the machine tool bottleneck, deliveries of military planes have reached the figure of nearly 1000 a month. Jet deliveries are 5 times the rate of 2 years ago.

Plane delivery rate is expected to continue to rise for another 6 months or so and then level off. This would mean that the country would be close to the goal of a 143-wing Air Force in another 18 months.

Foundrymen Given Price Increases

Earnings standard studies made by federal price-setters are paying off in the form of price increases for castings manufacturers.

Supplementary Reg. 2, Ceiling Price Reg. 60, allows a 5 pct increase in ceilings on carbon or low-alloy steel and manganese steel castings. SR 3, CPR 60, permits gray iron castings manufacturers a

9 pct rise in prices of their products. Both SR 2 and SR 3, which took effect Jan. 2, were issued after Office of Price Stabilization surveyed the earnings positions of producers concerned.

In each instance, OPS found higher wages for labor and rising costs of materials had "materially decreased" manufacturers' earnings.

New ceilings calculated under SR 2 and SR 3 may be adjusted further through use of authorization contained in General Overriding Reg. 35, which permits prices to reflect increased costs of steel, pig iron, copper, and aluminum.

Metal Inventory Curbs Relaxed

In year-end actions, National Production Authority lifted inventory controls from gray iron castings (except cast iron soil and pressure pipe and fittings) and malleable iron castings.

At the same time, inventory controls were also removed from aluminum foil, aluminum powder, cerium metal and alloys, natural graphite, iridium, and copper chemicals.

In other actions, NPA revoked

Dirs. 1 and 4 to M-46 and Dirs. 1 and 2 to M-46A which cover allocation of critical materials to domestic and foreign oil and gas industries.

These related to the regulations requiring charge-backs for late shipments and also to regulations extending validity of third quarter authorizations through Dec. 31.

In still another routine action, NPA revoked Dir. 6 to M-1, an emergency measure following the steel strike to assure delivery of military and atomic energy orders.

Tin Allocation Controls Lifted

National Production Authority began the New Year by removing allocation controls from pig tin.

In addition, NPA amended M-8 so as to authorize some additional uses of tin and tin oxide and likewise increased the amount permitted for selected purposes.

There is no change, however, in the overall permitted use quota of 90 pct of base period consumption. All tin users must continue to comply with both quota and use limitations. Major changes were:

Pig tin may be purchased without allocation but orders must be certified for use under M-8.

IRON & STEEL: November Output By Districts

As Reported to the American Iron and Steel Institute

DISTRICTS	Number of Companies	Annual Capacity	PIG IRON		SPIEGEL, FERRO-MANGANESE		TOTAL			
			Nov.	Year to Date	Nov.	Year to Date	Nov.	Year to Date	Pct of Capacity	
									Nov.	Year to Date
Eastern	12	13,983,580	1,120,542	10,452,017	30,215	258,055	1,150,757	10,710,072	100.3	83.7
Pitts.-Yngstn.	17	27,468,800	2,293,496	20,348,627	30,369	227,754	2,323,865	20,576,381	103.1	81.8
Cleve.-Detroit	6	7,501,100	666,856	5,790,614	.....	.....	666,856	5,790,614	108.3	84.3
Chicago	7	15,703,740	1,289,320	11,344,554	.....	.....	1,289,320	11,344,554	100.1	78.9
Southern	8	5,648,620	473,230	4,446,543	11,139	70,717	484,369	4,517,260	104.5	87.4
Western	3	3,476,700	312,121	2,710,174	.....	.....	312,121	2,710,174	109.4	85.2
Total	35	73,782,340	11,555,565	55,092,529	71,723	556,526	6,227,280	55,649,055	102.9	82.4

STEEL —NET TONS	Number of Companies	TOTAL STEEL (Incl. Alloy Steel, Carbon Ingots)					ALLOY STEEL		CARBON INGOTS		
		Annual Capacity	Nov.	Year to Date	Pct of Capacity		Nov.	Year to Date	Nov.	Year to Date	
					Nov.	Year to Date					
DISTRICTS											
Eastern	23	21,709,870	1,809,318	16,173,292	101.6	81.4	162,366	1,321,019	396,703	3,406,568	
Pitts.-Yngstn.	34	42,350,760	3,645,041	32,463,649	104.9	83.7	514,791	4,663,115	461,495	3,916,748	
Cleve.-Detroit	8	10,485,380	905,529	8,178,635	105.2	85.2	80,722	680,231	87,570	831,029	
Chicago	16	22,258,500	2,043,203	17,387,983	111.9	85.3	156,246	1,334,093	301,703	2,603,102	
Southern	11	5,291,260	465,870	4,096,003	107.3	84.6	6,842	65,017	1,883	16,840	
Western	12	6,491,900	569,925	5,186,651	107.0	86.9	10,319	104,621	30,620	221,177	
Total	82	106,587,670	9,438,886	83,466,213	105.9	84.0	931,296	8,166,096	1,270,954	10,995,464	

Industry Controls This Week

Brass—Amend. 2, CPR 68 increases ceiling prices of certain brass mill products.

Castings—SR 1, CPR 60 permits producers of malleable iron castings to increase ceiling prices 6.2 pct. SR 3, CPR 60 allows producers of gray iron castings a ceiling price increase of 9 pct. Amend. 8, CPR 60 defines the different categories of castings. SR 2, CPR 60 authorizes a 5 pct price boost for producers of carbon or low alloy castings and manganese steel castings.

Copper—Amend. 5, GOR 35 permits manufacturers who use products containing primary copper and whose ceiling prices are covered by GPCR to pass through the increased cost of these products resulting from SR 125, GPCR.

Critical Materials—Revoc. Dirs. 1, 4, M-46, and Revoc., Dirs. 1, 2, M-46A removes regulations covering allocation of critical materials to domestic and foreign oil and gas industries. Revoc. Dir. 6, M-1 lifts emergency order imposed after the steel strike designed to assure delivery of military and atomic energy orders.

Machinery—Amend. 2, SR 8, CPR 30 gives manufacturers of custom-designed and fabricated products covered by SR 8, CPR 30 until Jan. 31 to choose an optional method of figuring Capehart adjustments to their ceiling prices. SR 10, CPR 30 provides manufacturers of cotton-ginning machinery a 4.7 pct increase in ceiling prices. These manufacturers may also obtain further increases to cover recent boosts in metals costs and outbound freight charges by using provisions of GOR 35 and SR 9, CPR 30.

Pig Tins—Amends., M-8 remove allocation controls from pig iron and authorize additional uses of tin and tin oxide and likewise increase the amount permitted for selected purposes.

Small Manufacturers—Amend. 3, CPR 161 shifts the place of filing reports on new commodities from Washington to the nearest district office for all manufacturers whose gross sales last fiscal year did not exceed \$1 million.

Warehouse Prices—Amend. 8, CPR 98 authorizes warehouse resellers of tool steel bars and drill rods to increase their ceiling prices to offset increased transportation costs.

STRUCTURALS: Quotas Hit New High

DPA reveals highest structural quotas yet under CMP for second quarter . . . Nearly one-fourth higher than first quarter . . . Roads and rails included among biggest gainers.

Initial second quarter allocations of structural steel were issued for 1,693,000 tons, 119 pct of estimated 1,415,000 tons supply.

Structural Scoreboard

	1st Qtr '53 (Tons)	2nd Qtr '53 (Tons)
Total to Claimants	1,181,955	1,476,106
MRO-Self Cert.	118,191	210,939
DPA Reserve	42,419	5,740
Grand Total	1,342,565	1,692,785
SUPPLY	1,415,000	1,415,000
Pct of Supply	94.9	119.6
GENERAL CLAIMANTS	708,147	802,899
Agriculture Dept.	7,438	13,000
Army Dept.	9,800	8,200
Atomic Energy	85,758	54,630
Civil Aero. Admin.	5,600	6,400
Defense Dept.	168,000	145,000
Defense Electric Power	90,000	120,000
Defense Fisheries	0	200
Admin.	0	200
DMPA	25,760	25,760
Defense Solid Fuels:		
Coal Mines	5,100	5,500
Coke Ovens	4,800	8,500
DTA	24,450	30,092
Civil Defense	0	10
Federal Security:		
Education	28,000	33,700
Hospitals	20,110	24,013
General Services		
Admin.	3,500	5,100
Housing	5,250	5,000
Interior Dept.	501	1,745
Maritime Admin.	13,930	17,979
OIT-MSA	31,787	40,000
PAD	59,800	72,000
Public Roads	115,421	185,000
Veterans Admin.	1,942	1,100
NPA	473,809	673,207
Agricultural	11,040	16,000
Aircraft-Ord. & Ships	17,100	23,222
Aluminum, Magnesium	0	0
Building	3,911	4,832
Canadian	35,420	55,000
Chemical	0	0
Communications	4,700	4,500
Construction Mach.	23,055	34,407
Consumer Durables	0	0
Containers & Packag-		
ing	0	0
Copper	0	0
Electrical Equip.	9,680	12,400
Electronics	0	481
Engine & Turbine	227,995	31,200
Facilities Bureau ¹	172,921	221,000
General Components	0	0
General Industrial	37,145	34,902
Iron & Steel	6,600	10,500
Leather & Leather		
Prds.	0	0
Lumber & Wood		
Products	0	61
Metalworking Equip-		
ment	11,459	10,000
Mining Machinery	8,252	9,036
Misc. Metals & Miner.	0	75
Motion Picture—		
Photo Prod.	0	41
Motor Vehicle	0	7,000
Printing & Publishing	0	0
Pulp, Paper &		
Paperboard	0	0
Railroad Equipment	99,690	187,294
Rubber	0	192
Scientific & Tech.		
Equip.	720	849
Service Equipment	0	2,525
NPA Reserve (Gen'l)	2,251	5,000
NPA Hardship Cases	1,889	2,500

¹As of Dec. 22, 1952

²Original Allotments

³Includes Construction Controls, Industrial Expansion and Water Resources

This is the first time Defense Production Administration has made initial allotments on the basis of a full quarter's supply or more since the steel strike.

Full requirements of the defense program, including atomic energy needs, have been met. In addition, substantial provision has been made for stepping up construction of highway and street work, power facility construction, petroleum expansion, transportation needs.

A Tall Hike—One of the biggest rates of increase went to the Bureau of Public Roads, where the allotment went to 185,000 tons.

A similar high increase went to manufacturers of railroad equipment, where the second quarter allotment totaled 187,000 tons.

Industrial and related expansion programs got 221,000 tons, a smaller rate of increase since these had been getting substantial portions of needs.

Allotments for petroleum expansion were boosted by 20 pct to 72,000 tons. Most of this is slated for new refinery construction, particularly for aviation gasoline, and for oil field equipment.

A special reserve of 211,000 tons was set aside to take care of self-certifications.

Steel Inquiries and Awards

Structural steel awards this week:

- 3000 Tons, Des Moines, Ia., Auditorium, to Pittsburgh Des Moines Steel Co.
- 1000 Tons, Richmond, Ind., powerhouse to Pittsburgh Des Moines Steel Co.
- 900 Tons, Aurora, Colo., water pipe, to Thompson Pipe & Steel Co.
- 810 Tons, Shreveport, La., Spring Street Viaduct for Louisiana State Highway Dept. to American Bridge Div. of U. S. Steel, Birmingham, Ala.
- 430 Tons, New Orleans, La., St. Bernard Ave. Underpass at Florida Ave., for City of New Orleans, to American Bridge Div. of U. S. Steel, Birmingham, Ala.

Reinforcing bar awards this week:

- 380 Tons, Chicago, Halsted St. Cloverleaf to Hurlbly Mid-Continent Co.

Reinforcing bar inquiries this week:

- 6000 Tons, Chicago, underground parking garage.

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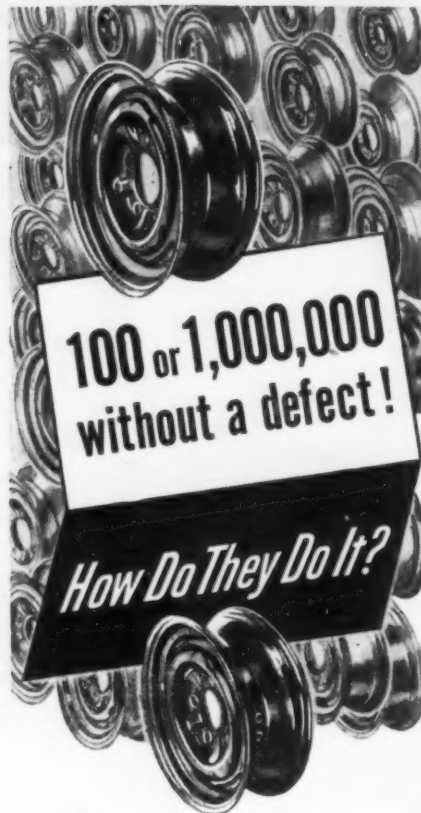
CHICAGO 44, ILLINOIS

Manufacturers of Couplings, Universal Joints and Variable Speed Transmissions

January 8, 1953

49

Industrial Briefs



**100 or 1,000,000
without a defect!**

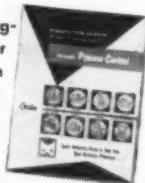
How Do They Do It?

HAVE you ever wondered how 100 or 1,000,000 identical objects—from auto wheels to rifle barrels—can be produced without a defect in the lot?

Some manufacturers do it by final inspection, with rejection of all pieces not up to standard. This does the job *but* is needlessly costly!

The *economical* answer is process control. *Usually it includes inspection by Magnaflux' Methods.* We think of it as "correctioneering"—the detection of invisible cracks and defects at the earliest possible stages of production so that their cause can be corrected. This assures quality and reduces costs by preventing waste of labor and machine time on parts or materials that are defective.

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Change of Address — DUMAS STEEL CORP. has moved its headquarters from 923 Penn Ave., Pittsburgh, to Arch Street, Carnegie, Pa.

Becomes Partner — Henry Fiestal has joined his father as a partner in scrap iron and steel brokerage. New name of the firm is **HARRIS FIESTAL & SON**, New York.

New Distributor — REYNOLDS METALS CO. has appointed Nathan Trotter & Co., Philadelphia, its new aluminum pig and ingot distributor to serve foundries in that area.

Steel Drum Firm — Operations were begun last month by **RHEEM OF THE PHILIPPINES, INC.**, the Philippines' first mass-producing steel drum manufacturing industry.

Calcium Carbide Plant — AIR REDUCTION CO., INC., New York, is going to double capacity of its new calcium carbide plant at Calvert City, Ky.

Becomes Division — The Jones & Laughlin Supply Co., Tulsa, Okla., a wholly-owned subsidiary of **JONES & LAUGHLIN STEEL CORP.**, became a division of the corporation the first of the year. It is to be called the Supply Div.

Mineral-Bearing Lands — NATIONAL LEAD CO. recently purchased several thousand acres of mineral-bearing lands near Jacksonville, Fla. The land contains titanium and zirconium ores.

New Headquarters — THE MEEHANITE METAL CORP. has moved into new headquarters at 714 North Ave., New Rochelle, N. Y.

Second Expansion — MICHIGAN SCREW PRODUCTS CO. broke ground recently for a new factory and office building at 11 Mile Rd. and Sherwood, Warren Township, a Detroit suburb. This was the company's second expansion since 1949.

South's First — WESTINGHOUSE ELECTRIC CORP. will build the South's first welding electrode plant between Calera and Montevallo, Ala., as part of its \$296 million expansion program.

New President — Howard M. Palmer, Lewis-Shepard Products Inc., Watertown, Mass., was elected president of **THE MATERIALS HANDLING INSTITUTE** for 1953.

Sales Increased — WARNER ELECTRIC BRAKE & CLUTCH CO., Beloit, Wis., increased its sales 32 pct in 1952.

New Facilities — PARK CHEMICAL CO., Detroit, has acquired new manufacturing and warehousing facilities at 3031 Melvale St., Philadelphia. T. J. Clark will have complete charge of its operation.

Name Changed — Graham-Mintel Instrument Co., Cleveland, has changed its name to **CLEVELAND INSTRUMENT CO., INC.**

Company Purchased — John Harsch Bronze & Foundry Co., Cleveland, has been purchased by **FERRO MACHINE & FOUNDRY, INC.**, Cleveland, as part of its product diversification program.

New Dock — The Contracting Div., DRAVO CORP., will construct a new dock for unloading of petroleum product barges on the Kanawha River at Boomer, W. Va., for Esso Standard Oil Co.

Big Move — U. S. PIPE & FOUNDRY CO. will move its general headquarters from Burlington, N. J., to Birmingham, Ala., as soon as an office building can be erected in Birmingham.

Aircraft Parts Plant — F. H. MCGRAW & CO., New York, has been awarded a contract to build a \$1,250,000 aircraft parts plant in Newington, Conn., for Fenn Mfg. Co. of Hartford.

Additional Space — REED-PRENTICE CORP., Worcester, completed a new factory building recently which provides 23,000 additional square feet of space for the assembly of large vertical milling machines.

Profit Sharing — SPECIAL MACHINE TOOL ENGINEERING WORKS, New York, has distributed \$131,200 to 155 employees under its profit sharing plan.

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block insulation for
1900F?**

**SUPEREX ...
with the proved record
for long service!**

**The most widely used
high temperature block insulation
for over a quarter century...**

SUPEREX® high temperature block insulation has long been industry's No. 1 choice for service temperatures up to 1900F. It provides *major* economies . . . reduces fuel costs, cuts heat losses, keeps maintenance expense down, costs less to install and has long service life.

These are the reasons why 90% of the nation's hot blast stoves are Superex insulated . . . and why the low cost open hearth steel producers use Superex in their regenerators.

Made of specially selected and calcined diatomaceous silica blended with other insulating materials and bonded with asbestos fiber, Superex will safely withstand temperatures up to 1900F with negligible shrinkage.

Superex has been used with outstanding success in all types of industrial and metallurgical furnaces and ovens, stationary and marine boilers, auxiliary power plant equipment, regenerators,

kilns, roasters, high temperature mains, flues and stacks.

**Superex has all these
important advantages...**

Low thermal conductivity—Exceptionally high heat resistance (1900F) combined with excellent insulating value.

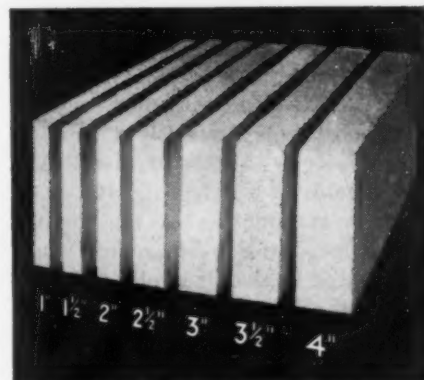
Light weight—Approximately 2 lb per sq ft per in thickness.

Great physical strength—Approximately 6 tons pressure per sq ft are required to compress Superex ¼ in.

Long, efficient service life—Superex maintains high insulating value indefinitely—will not disintegrate in the service for which it is recommended.

Fast, easy application—Superex may be cut with an ordinary knife or saw for fitting around openings or to irregular surfaces. Because of its light weight and convenient sizes, Superex assures fast and economical installations.

For complete information about Superex block insulation, write for Brochure IN-134A. Address Johns-Manville, Box 60, New York 16, N. Y. In Canada, write 199 Bay Street, Toronto 1, Ontario.



Waste is minimized with Superex because of the variety of thicknesses available. Special shapes and intermediate thicknesses between those shown are also available.



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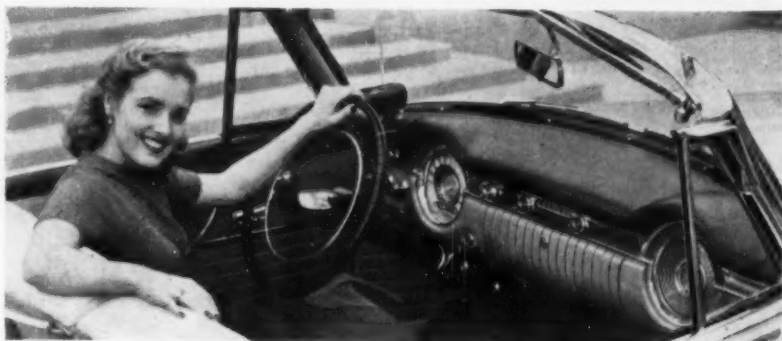
The Automotive Assembly Line

Chevrolet Expects Good Sales Year

More expensive model, costly accessories added in anticipation of strong market . . . Engines juiced up . . . Olds offers air conditioner . . . Little price change—By R. D. Raddant.

The car that more Americans will probably buy in 1953 than any other make or model goes on display Jan. 9 in Chevrolet showrooms. A confident dealer organi-

sive car as well as offering costly accessories indicates the strength of the market anticipated by this division of General Motors. These new options include power steering



PADDED PANEL: Optional equipment in the 1953 Oldsmobile Series "98" is this safety padded instrument panel. Upper part is foam rubber covered with flexible plastic matching lower portion of panel in color.

zation predicts that more than 4 million persons will visit dealerships on that day.

According to past performances, more than 1 million of them may buy one before the year is out. This figure will go much higher if trucks are counted.

What the visitors will see is a re-styled exterior with new fender and body lines giving it a bolder appearance with greater visibility.

Probably of greatest significance is the introduction of an entire third line, the Bel Air, which was introduced to give Chevrolet a wider cut of the car market. As Chevrolet's luxury model, the Bel Air will edge into the medium priced field. Other lines are the "One-Fifty" and the "Two-Ten" replacing the Standard and De Luxe classes.

High Hopes — The fact that Chevrolet, considered in the low price field, is adding a more expen-

sive car as well as offering costly accessories indicates the strength of the market anticipated by this division of General Motors. These new options include power steering

and the Autronic Eye. Three station wagons will round out the passenger lines. Getting away from styling and economics, Chevrolet will retain the basic 6-cylinder valve-in-head engine, but with several improvements. Bore and stroke have been squared up to 3 9/16 x 3 15/16 in. with displacement upped from 216 to 235 cu in. Compression ratio is up from 6.6 to 7.1 for the regular engine which generates 108 hp.

The Powerglide engine has a compression of 7.5 and develops 115 hp. This unit has new aluminum pistons, eliminating the need for piston pin bushings. Pistons have cam-ground skirts and steel struts to control expansion. Steel backed, thin wall connecting rod insert bearings have been adopted. Another development is full pressure lubrication.

The Powerglide automatic transmission now provides for an auto-

matic shift to improve pickup. With the selector lever in drive, the transmission starts in low range and upshifts as speed increases. At speeds below 40 mph, the Powerglide downshifts when driving conditions demand more power.

Oldsmobile—Biggest changes in the 1953 Oldsmobile went on under the hood where a 12-v battery system assists in stepping up the compression ratio of the "Rocket" engine.

The new Oldsmobiles will also go on display for the first time Jan. 9.

Chief styling revisions in Oldsmobile are in the front end where grille and hood have been changed. In some models, the rear deck line has also been heightened. The two larger cars will be powered by the "Rocket" 165-hp engine while the Deluxe "88" is powered by a 150-hp version of the "Rocket" engine.

Oldsmobile will introduce the highly publicized Frigidaire car conditioning unit which is said to bring car temperatures to a comfortable level in six city blocks of driving. The unit has a thermostatic control in the instrument panel which will maintain temperature at a comfortable level.

Refrigeration unit is located on the rear trunk shelf with the rotary compressor installed on the side of the engine where it is run by a dual pulley off the crankshaft.

Prices Hold—Not all 1953 models have been announced yet but it is safe to assume that there will be no price changes of any significance among the cars still to hit the market.

Pattern of holding the line, and even some small reductions, was apparently set last fall when the new Dodge prices were disclosed. There has been no departure from that formula and none is indicated.

Shortly after Pontiac's prices were disclosed, roughly the same as in 1952, an executive from an-

other GM division was asked about the prices of his own product, still undisclosed.

Strong Hint — He pointed out frankly that, while he did not have the authority to give out any figures, the policy of his corporation was obviously established. It took no genius to guess that there would be little revision in his own division.

This was emphasized last week when Cadillac announced well in advance of the new model date that prices of 1953 cars will be the same as 1952 models. J. M. Roche, general sales manager, said factory list prices will range from \$3571.33 for the Series 62 coupe to \$5620.93 for the Imperial limousine.

Increased production facilities for power steering will enable the division to pare \$21.45 from the cost of this appliance, selected by 80 pct of Cadillac owners.

Conveyer Speeds Body Assembly

One of the key features of new tooling and plant revision at Studebaker is the installation of a 5310-ft conveyer system at the company's South Bend plant. Costing \$625,000, it will be one of the longest automobile body conveyers.

The conveyer will carry fabricated bodies and hardware trim to the final assembly line. On the return trip it will carry fenders from a supply building to the body plant.

P. O. Peterson, executive vice-president of Studebaker, claims changes in materials handling will result in improved body construction. For example, the new system will permit rear fenders to be attached before bodies leave the body shop, instead of on the final assembly line.

The new conveyer will start at the sixth floor level of the body plant and will cross the public street at third floor level. Bodies will be carried over or through seven buildings, a one-way distance of 2055 ft. The return trip is longer in order to pick up parts destined for the body plant.

The conveyer enclosure is 17

Automotive Production (U. S. and Canada Combined)			
WEEK ENDING	CARS	TRUCKS	TOTAL
Jan. 3, 1953	83,906*	23,337*	187,243*
Dec. 27, 1952	82,844	20,364	103,208
Dec. 22, 1951	38,251	15,350	53,601
Dec. 15, 1951	26,584	12,904	39,488
*Estimated		Source: Ward's Reports	

ft wide and 10 ft high. It is constructed of galvanized decking over a steel framework, with an inside walkway providing maintenance access. It was constructed by the Anchor Steel and Conveyor Co., Detroit.

Good Year Despite Strike Curbs

Totalling up the achievements of the auto industry during 1952, the Automobile Manufacturers Assn. put together quite a list in spite of the double impact of steel strike and restriction effects.

For one thing, the late season surge brought automotive employment at year's end to an all-time high of about 900,000.

Total car registrations increased 2½ pct above the 1951 total to an estimated 53,363,000 vehicles. This includes 43,894,000 passenger cars and 9,469,000 trucks and buses.

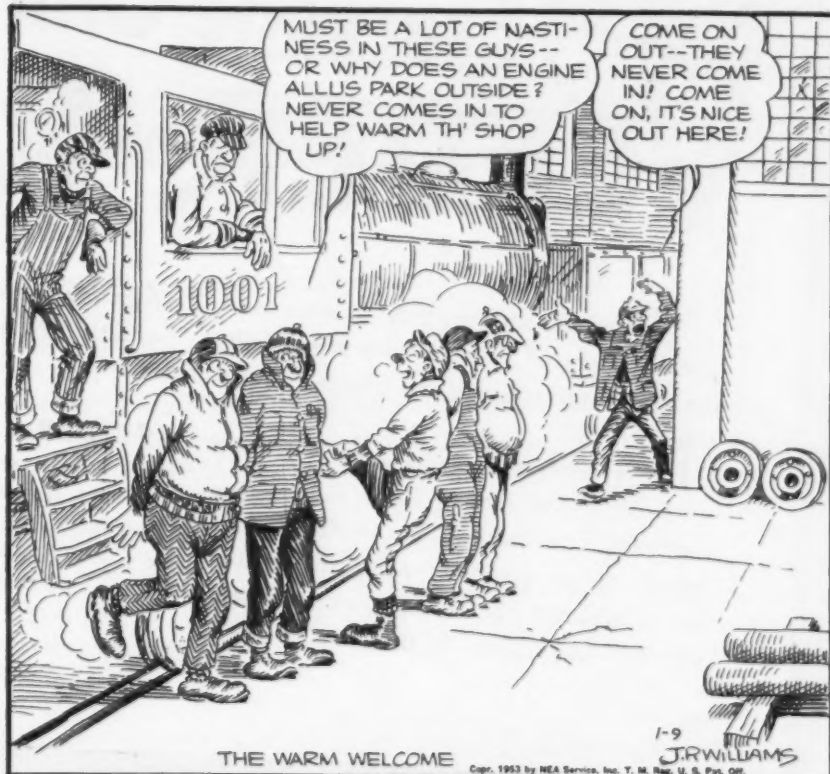
Production of replacement parts and accessories, commonly overlooked as a minor sideline of the automotive world, showed a wholesale value of \$2.45 billion. This figure, large as it is, is still \$100 million below the 1951 figure.

Total 1952 payroll for production employees reached an estimated \$2.6 billion, about 8 pct less than 1951 and only 4 pct below the big production year of 1950.

Special taxes on all vehicles totalled \$5 billion.

THE BULL OF THE WOODS

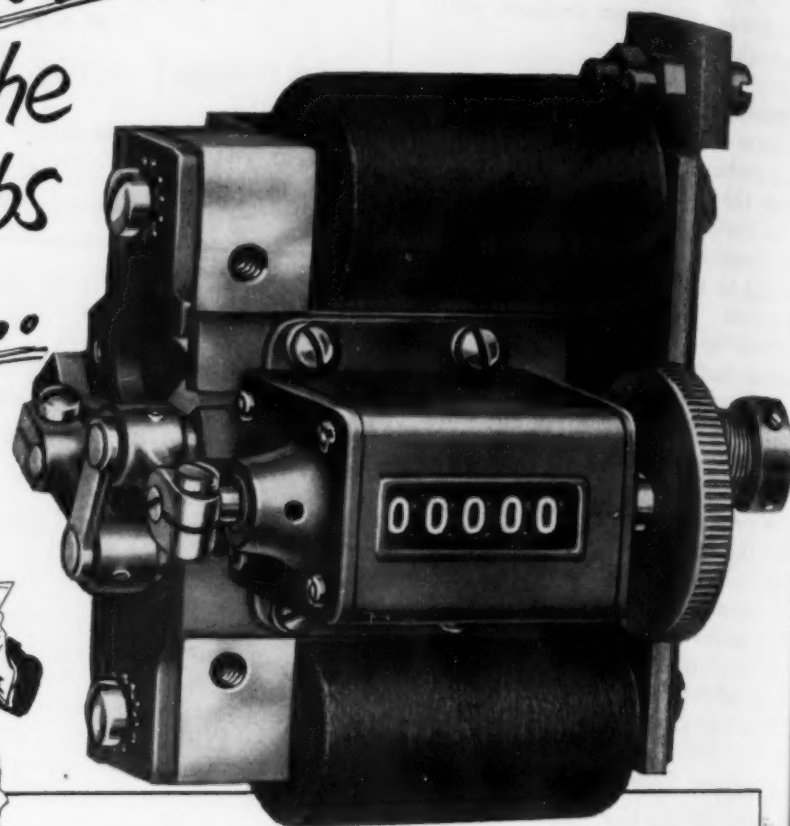
By J. R. Williams



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West Coast Report

New C. F. & I. Capacity Blossoming

Steel company expands at rapid rate—right in the middle of the oil fields . . . Also spreading eastward through new holdings . . . Latest is Roebling purchase—By T. M. Rohan

The booming oil and steel industries of the West are joining hands at Pueblo, Colo.

In the heart of a mid-continental cattle and oil empire, Colorado Fuel and Iron Corp. is erecting a \$27-million seamless tube mill to climax the biggest year in sales volume in its history. This mill with top annual capacity estimated at 175,000 tons will be about fifth largest in the country and only major one in the West.

And in New York last month, C. F. & I. announced purchase of John A. Roebling's Sons Co. with plants in Trenton and Roebling, N. J. Net value of fixed assets involved is \$23.5 million and inventories are valued at \$17.5 million. Roebling's lines of electrical wire and cable and bridge products will be new products for C. F. & I. Total consolidated sales volume will probably hit about \$300 million annually, compared to \$195 million in the fiscal year ended in June, 1952.

Facilities—Roebling will bring C. F. & I. holdings to 11 plants. Others are the parent Pueblo operation; Wickwire-Spencer Div. with plants at Buffalo, N. Y., Worcester, Palmer and Clinton, Mass., and Claymont plant at Claymont, Del.; California Wire Cloth plants at Oakland and So. San Francisco and American Wire Fabrics at Mt. Wolf, Pa.

In addition, the company has its own water supply for the Pueblo plant, sells coal and coke, runs a railroad (dieselized last year), a telegraph company, and other facilities. And new acquisitions under the aegis of Pres. A. F. Franz at Denver and Charles Allen, Jr., New York financier who gained

control of the firm in 1944, are strongly rumored.

Oil Well Tubing—Centrally located in a heavy oil and gas producing area having 75 pct or more of known U. S. reserves, with good

lar goods in 1953. In 1952 alone the oil industry spent about \$4 billion in expansion of all facilities.

Rails and Wire—The tube mill will be a major departure from C. F. & I.'s traditional output in line with a diversification program started several years ago. First rail roller in the West in 1882, rails and fastenings still represent over half the tonnage volume at Pueblo. Merchant and structural steel tonnage is also sizable, including grinding media, grader



BUSY: Pueblo, Colo., plant of Colorado Fuel & Iron Corp.

rail facilities, capacity production at Pueblo seems certain for a long time. Only new seamless competition is Republic which is bringing in a new mill in South Chicago. And C. F. & I. has a comfortable freight umbrella against midwestern and eastern competition. Western Tube at Los Angeles is also a possibility but has been stagnant lately.

Petroleum Administration for Defense is shooting for 55,000 new wells in 1953 as compared with about 45,000 for 1952. Their recent estimates indicate a shortage of over 550,000 tons of domestic tubu-

blades and other specialty products. The new rod mill installed in 1949 and new finishing facilities have made possible large expansion of rods, fencing, nails, wire and new wire products, second largest class of tonnage.

The rail market has held at high levels in recent years due to increasing population, industrial growth, farm and mine production, and construction in western states. Since only C. F. & I., U. S. Steel, Bethlehem and Inland roll standard rails, demand is brisk and seems likely to continue well into the future.

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"Mr. Big" - being completely free of harmful carbide segregation is proof that a positive control exists for eliminating segregation.

"Mr. Big" could not be produced to the same high quality standards by any process other than the "DESEGATIZED" process.

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"Mr. Big" is the largest perfect bar of high speed steel ever produced ... 10 inches in diameter ... 9 feet 6 inches long ... and weighs approximately 2600 pounds.



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Latrobe
STEEL COMPANY

This Week in Washington

Will We Leave Sidelines on Seaway?

Going ahead reports from Canada on seaway fan Washington interest . . . New York applies for power rights, Jersey firm may want part . . . Construction future solid—By G. H. Baker.

Reports from Ottawa about the "positive steps" that may be taken in the next few months leading toward construction of the St. Lawrence seaway are prompting fresh Washington interest in plans for joint U. S.-Canadian sponsorship of the project.

Canada last year made it clear it would build the seaway either with or without U. S. cooperation. And the Canadian government is supporting New York Power Authority's application (to the Federal Power Commission) for a license to develop power in the international section of the St. Lawrence River.

Charge Toll — One company (Public Power & Water Corp., of Trenton, N. J.) says if the FPC approves the hydro license, it will then seek permission to build the seaway. Navigational features are not involved in the pending power application at the FPC.

H. A. Spalinsky, P. P. & W. president, tells the FPC his company would dredge a 30-ft channel as far downstream as Montreal. His firm would charge a toll for use of the seaway, but not for traffic on the canal next to the power project.

Building Optimism—The relative freedom from controls over steel, copper, and aluminum that lies ahead is generating new optimism in the construction industry.

Government construction plans in two areas—atomic energy and toll roads—may hypo 1953 building outlays to a new record high, passing 1952's peak of \$42.3 billion. Unofficial forecasts place this year's total volume at \$44

billion at home and \$1 billion in U. S. construction abroad.

Industrial contractors do not foresee any lessening of new projects. Any tapering off in current industrial expansion plans should be more than offset by gains—possibly as much as 25 pct—in commercial building which has been postponed because of CMP regulations. The "boom" plans of utilities, particularly gas and electric light companies, will add their weight.

Defer Engineers — Congress is to be asked to slow up the loss of qualified industrial engineers to the military services. Drain on the nation's dwindling pool of high-grade engineering talent has become a serious problem since the outbreak of the Korean war.

Present plans of some industrial personnel experts call for an early

appeal to the incoming Congress to set up a special civilian agency which would decide whether or not certain skilled professional groups ought not to be deferred from recall to military service.

Least Trouble—Pitch will be made that such a program will involve the least possible disruption of civilian activities essential to the national strength and security.

Proposed agency would have no jurisdiction over members of active organized units of the ready reserve. It would deal only with reservists not members of such units.

On the Wane — Congressional clamor for large-scale imports of aluminum from Canada is subsiding as a result of the go-ahead signals that have been flashed for two major domestic expansion programs.

This may not mean that the Canadian deal is a dead duck. A number of congressmen say that aluminum fabricators will continue to be hard-pressed for supplies for some time to come, in spite of the domestic expansion programs either underway or on drafting boards.

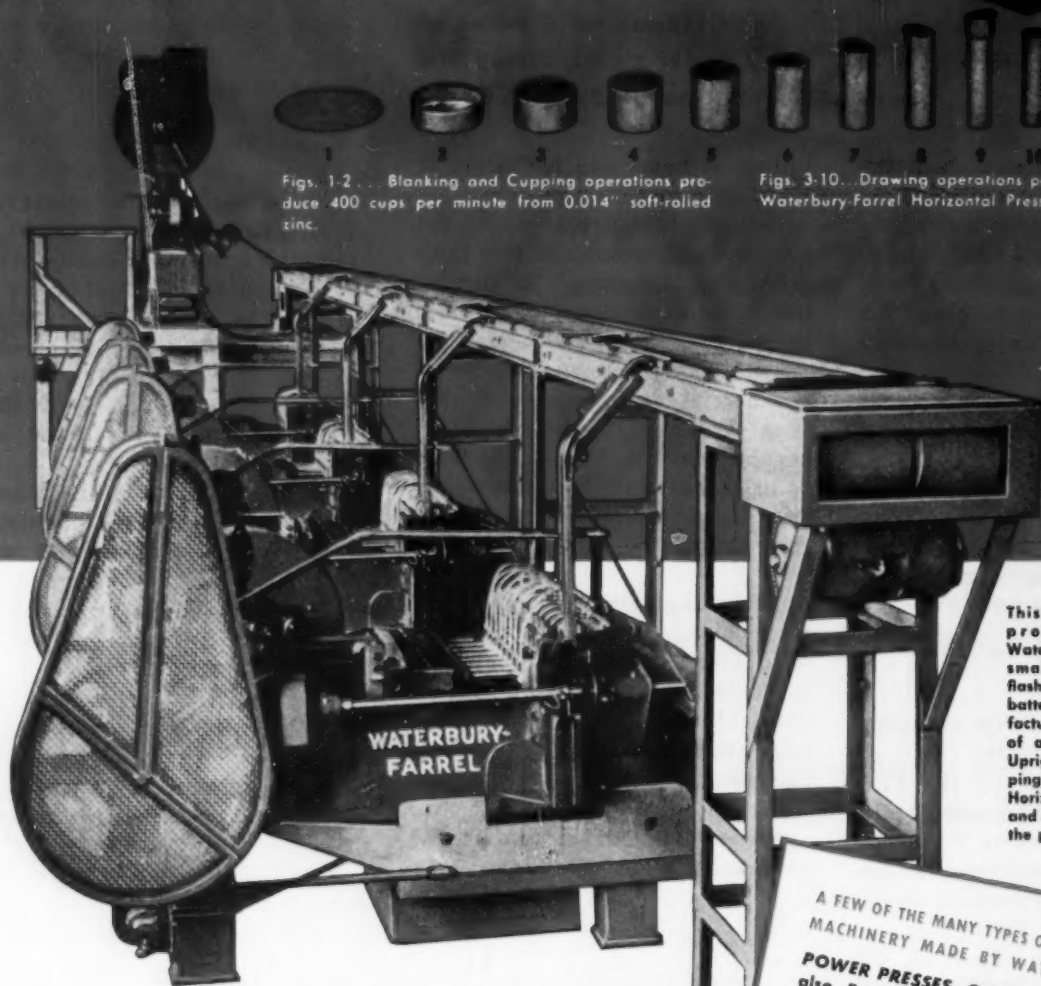
Harvey Plant — Approval last week by Defense Production Administration of fast amortization for a 54,000-ton reduction facility to be built at The Dallas, Ore., by Harvey Machine Co., Inc., Torrance, Calif., brings recent capacity-expansion plans to the 164,000-ton mark. Earlier, DPA okayed fast writeoff on a 110,000-ton facility to be built by Olin Industries, Inc., East Alton, Ill.

One congressman, Rep. Celler, D., N. Y., says the government's failure to enter into a long-term purchase arrangement with Canada is "outright foolishness." He blames congressional pressure for the omission, and says DPA and NPA "wish" to negotiate an agreement, but are held back.



THIS WATERBURY-FARREL PRESS PRODUCTION TEAM

draws
340 shells
per minute



Figs. 1-2... Blanking and Cupping operations produce 400 cups per minute from 0.014" soft-rolled zinc.

Figs. 3-10... Drawing operations performed by each Waterbury-Farrel Horizontal Press.

This complete, automatic production unit by Waterbury-Farrel produces small zinc containers for flashlight and hearing aid batteries for a large manufacturer. The unit consists of a 40-ton Double-acting Upright Blanking and Cupping Press, four 7-station Horizontal Drawing Presses and a conveyor which feeds the presses.

Here's an example of the automatic mass production you can get with Waterbury-Farrel horizontal drawing presses.

These modern deep-drawing machines are available singly or in complete production line setups. The presses are available in a wide range of sizes for handling a large variety of work. The number of stations range from 5 to 12; maximum strokes from 3" to 26"; production speeds up to 100 per minute.

Features Include:

- High production — continuous deep drawing with no intermediate annealing.
- Patented shell transfer mechanism.
- Patented die-holder lubrication.
- Horizontally held shells cannot be deformed by trapped liquid.

For further details, write, wire or phone your nearest Waterbury-Farrel office.

WATERBURY FARREL FOUNDRY & MACHINE COMPANY

A FEW OF THE MANY TYPES OF METAL WORKING MACHINERY MADE BY WATERBURY-FARREL

POWER PRESSES—Crank • Cam and Toggle; also Rack and Pinion Presses • Transfer Presses • Multiple Plunger Presses • Hydraulic Presses, etc. **WIRE MILL EQUIPMENT**—Continuous Fine Wire Drawing Machines, including upright Cone and Tandem types, Bull Blocks • String-up Machines • Spoolers, etc. • **COLD PROCESS BOLT AND NUT MACHINERY**—Headers (all types) • Re-headers • Trimmers • Thread Rolling Machines • Nut Tappers, etc. • **MILL MACHINERY**—Rolling Mills • Wire Flattening Mills, Chain Draw Benches • also Slitters • Straighteners • Pointers • Swagers • Cut-off Saws • Coilers • Winders, etc.



In Equipment,
Experience Counts.

THE IRON AGE

RESOURCES: Shortages May Be Averted

NSRB sees good chances of avoiding raw materials shortages, higher production costs . . . Proposes steps to meet Paley Commission goals . . . Gives federal agency reaction.

Shortages of the materials needed to continue high production and gradual increases in costs of turning out items for the soldier and civilian may be averted, National Security Resources Board says.

Even though it appears supplies of some vital metals and minerals are rapidly vanishing, the possibilities of renewing them through scientific conversion methods are in the upswing.

In addition, there is growing promise of better utilization of substitutes, potentially of great value in stretching the known quantities of standard materials.

Initial Steps—These are some of the optimistic comments offered by NSRB in its new recommendations to the White House regarding proposals made last summer by the President's Materials Policy Commission (THE IRON AGE, June 26, page 55). In a 101-page pamphlet, NSRB proposes initial steps for meeting the commission's objectives in the field of natural resources management. The board evaluated each of the commission's 78 formal proposals, listing the concurrence or non-concurrence of cognizant departments and agencies.

To encourage development of U. S. minerals resources, NSRB recommends a mineral leasing system as an optional alternative to claim-staking on public lands. It calls for expanded geologic and topographic mapping, research on exploration techniques, and basic fact-gathering by Interior Dept.

To promote importation of raw materials in which we are deficient, NSRB asks for legislation authorizing reduction or elimination of tariffs on short-supply items, adjustments in tax laws to stimulate U. S. investment in ex-

ploitation of foreign resources, and repeal of the Buy American Act.

Needs Time—Some of the materials supply problems it studied, NSRB says, will require more attention before specific proposals will be in order. Studies are suggested on the question of incentive devices for mineral industries, criteria for direct governmental exploration for minerals sources, and methods of setting up strategic reserves of petroleum.

Two of the principal recommendations NSRB makes concern atomic energy and possible U. S. participation in the St. Lawrence seaway and power project. In the first instance, the agency urges a clearing of the way to greater private participation in development and use of atomic energy as a source of power.

Change Act — Cooperation between Atomic Energy Commission and private concerns should be continued to "a maximum degree consistent with security," NSRB states. It calls for an amendment to the Atomic Energy Act outlin-

ing the conditions under which "private interests could operate commercially to benefit from their atomic power research, development, and production."

Chances for congressional approval of such an amendment may be good, for the act as passed in 1946 contains the statement that "any legislation will necessarily be subject to revision from time to time." AEC, Defense Dept., Interior Dept., and Federal Power Commission concur in the belief that private firms should be encouraged in developing ways for industry to utilize power from nuclear energy.

Should Share — NSRB believes Congress should be asked again to "authorize and provide funds for" a U. S. share in the building of the seaway and power project, arguing that unless this country participates in the construction it will not share in managing the waterway.

The Paley Commission urged seaway participation.

The Bulldog Makes the Grade

The T41E1 light tank, or Walker Bulldog, will be issued to Army units on a continuing basis now that the turret control mechanism and gun sighting system have been improved.

First shipment of the 26-ton vehicles recently left the Lima, Ohio, Ordnance Depot for an unannounced destination. Several hundred completed tanks were held back pending working out of needed modifications by the Army's Frankford Arsenal, in Philadelphia, and Cadillac Div. of General Motors.

With a 76-mm gun as its primary armament, the Walker Bulldog is powered by a 500-hp air-cooled engine and has Allison cross drive transmission. Primary combat role of the \$135,000 weapon is to probe, reconnoiter, and provide screening action while ground units deploy for offense or defense. It can be moved, in emergencies, by a large transport plane.

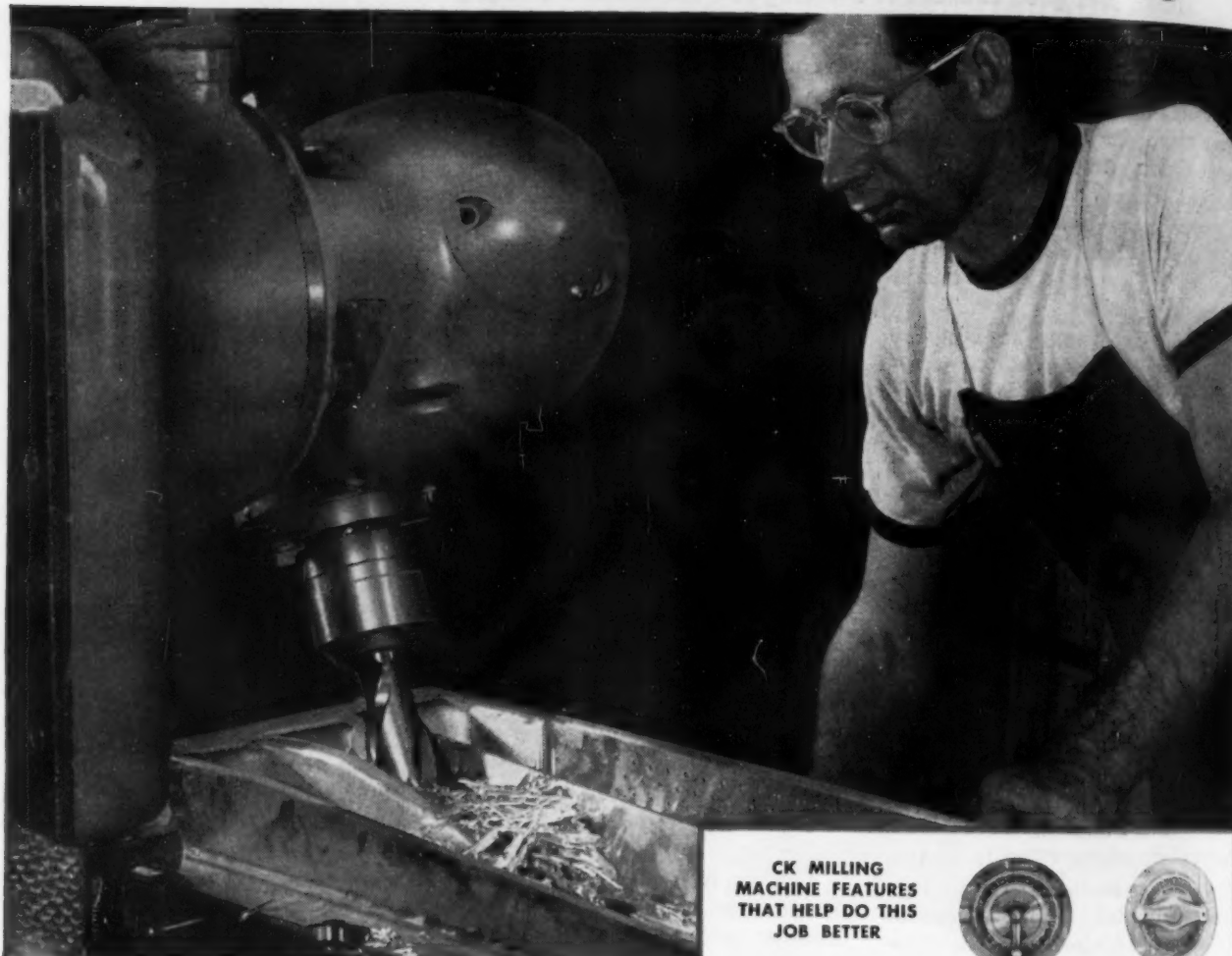
Cadillac is turning out the Walker Bulldog in Cleveland.



"I'd give you your usual \$4 tip but I'm not traveling for the company this time."

KEARNEY & TRECKER
MILWAUKEE

CK MILLING MACHINE SPEEDS OUTPUT OF STANDARD PRODUCTION PARTS



TEN ALUMINUM ALLOY 75ST (FORGING) AIRCRAFT SPARS PRODUCED EVERY HOUR FOR MAR VISTA ENGINEERING CO.

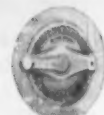
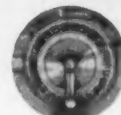
THE FACTS ON THIS JOB ARE: Machine: No. 6 — Model CK Plain (25hp) with heavy-duty universal Milling Attachment. Part: Large fuselage spar fitting — overall dimensions $39\frac{3}{8}$ " x $17\frac{3}{8}$ ". Material: Aluminum Alloy 75ST (forging). Tool: 2-inch, 2-lip end-mill. (HSS). Speed: 265 rpm. Feed: $3\frac{1}{8}$ imp.

HERE'S a typical example of how relatively inexpensive tooling greatly increases the versatility of Kearney & Trecker's new CK milling machines . . . producing a completed part every 6 minutes. Two operations were required for each part — (one) milling out the holes and recessing on the edges, then after changing the attachment setting and cutter — (two) finishing the inside (see photo). For the full story, contact your nearest Kearney & Trecker representative or write: Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.

KEARNEY & TRECKER
MILWAUKEE
MACHINE TOOLS



CK MILLING MACHINE FEATURES THAT HELP DO THIS JOB BETTER



Greater rigidity of new CK column easily absorbs vibration from heaviest cutting loads. Only single pass needed for each part.

This CK milling machine has 24 different spindle speeds (13 to 1300 rpm). Its 32 different table feeds ($\frac{1}{32}$ to 90 ipm). Operator was able to pick proper speed and feed, benefit from high horsepower modern tools.



CK's 3-bearing spindle and fly-wheel assures Maximum Cutter Efficiency. On this job, it meant fast metal removal and excellent finish in a single pass.



CK's new heavy duty (2" dia.) table feed screw gives greater bearing contact for smoother feed performance and sustained accuracy.



New CK machines have greater horsepower. On this job, 25 hp permitted operator to get maximum production from his modern cutter.

Machine Tool High Spots

Ford Readies for Jet Production

Orders 450 new machine tools for work on \$20 million jet engine contract . . . Many more will be needed for full-scale production . . . New orders continue to dip—By E. C. Beaudet.

Ford Motor Co.'s Aircraft Engine Div. at Chicago recently pulled the wraps off another \$20 million contract award. The amount was a supplement to the division's contract to produce J-57 jet engines for the Air Materiel Command. Value of these contracts so far is \$97 million.

Of this amount about \$50 million will be spent for the purchase of new machine tools and related equipment.

To change from reciprocating to jet engines, Ford has ordered around 450 new machine tools. Another 400 tools already in the Chicago plant will be switched from production of R-4360 Wasp Major reciprocating engines to the new J-57 pilot production line.

Next Year—First engines are expected to roll off the new jet line sometime during the first quarter of 1954. Production schedules run through mid-1955, while planning schedules extend considerably past that date.

Of the 450 new machine tools, 200 will be put in operation at the Chicago plant. The remainder will be shipped to manufacturers of jet engine components supplying the plant.

Ford, which had originally contracted to build the Pratt & Whitney Wasp Major reciprocating engines, will reach peak production on this model about the middle of this year. Manufacture of these engines will then be tapered off and will be discontinued entirely in 1954. The giant Ford plant will then be devoted entirely to production of J-57 jet engines used to power the B-52 intercontinental bomber. It will also be used in other aircraft.

Readapted Tools—Though Ford estimates that only 50 pct of the needed machine tools must be purchased and hopes to switch some 400 machine tools from reciprocating engine lines already in the plant, some sources indicate that "only a small percentage" of these tools can be readapted for jet engine production.

Present Ford machine tool requirements are for setting up pilot production only. By pilot production, the division means one machine of each kind required in the final production line. Quantity production would require more equipment. It is certain that more machine tools will be purchased to beef up this pilot line.

Government Pool—The jet pilot line would include between 800 and 1000 machine tools, with the top figure probably being closer to the actual amount. Of these about 100 will come from the government reserve of machine tools. However, cutoff of piston engine production and the complete switch to jet en-

gine output in 1954 will make only specialized machines available for return to the government's reserve pool.

New machines now being ordered are general purpose machine tools—turning, milling, precision boring, drilling, etc. Of the new tools required, about 100 have already been shipped to the plant. Delivery on the rest will be spread out over the next 6 to 8 months.

Over the Hump—Extent to which the machine tool industry is over the hump so far as defense requirements are concerned is indicated in the latest quarterly report of Defense Mobilizer Henry Fowler to the President. The report states that recent meetings of the Production Executive Committee, Aircraft Production Board and Electronics Production Board have shown that lags in defense production are no longer mainly due to bottlenecks in the flow of machine tools, materials and components.

Except for certain types of highly specialized tools requiring long lead times, the machine tool bottleneck is largely overcome. However, it is pointed out that despite the general easing of the machine tool situation, the order which assures the highest priority to the tools urgently needed for defense production should be retained as long as new and pressing military requirements continue to emerge.

New Orders Drop—New orders for machine tools continue to decline, according to preliminary reports from the National Machine Tool Builders' Assn. For November the new order index slipped to 210.1, the lowest point since April 1950. Shipments continued at a fairly high rate, 338.2 as compared with 357.8 the previous month.

The continuing high shipment rate has brought backlogs below the 11-month level to 10.3 months. Foreign orders for the month fell to 14.3 as compared with 22.5 in October.



**TOUGH PROBLEMS
AND THEIR
GREAT SOLUTIONS**



The Tea-Kettle that pulled a Train

"There's power in that steam," thought young Jim Watt, as he watched his kettle's dancing lid. "But how much is wasted!"

Eight years later, in 1765, as the 29-year-old inventor was walking of an afternoon in Glasgow Green, the solution came to him.

Watt condensed the steam in a vessel distinct from the cylinder, a basic idea that transformed the clumsy and wasteful steam engine of that period into so potent a prime mover that it made the locomotive possible.

It's great to have an idea. It's much more wonderful to make it work. That's where we come in.

Design engineers are constantly coming up with operating mechanisms that involve pliable parts. These parts must combine exactly the right physical characteristics with continued dependability even under extremely adverse conditions. It's a highly critical operational area.

Sirvene engineers have three great assets to offer you. The first is their unequalled experience in the highly specialized field of pliable parts. The second is their development of whatever Sirvene compound is best adapted to

the specific problems involved. The third is quantity production of laboratory high quality, assuring exact compliance with specifications.

The time to let Sirvene engineers help you is while your new product is still on the drawing board. Given an important idea, you cannot afford to risk its invalidation by possible part failure.

The monograph "Engineering with Sirvene" belongs in your file and will be sent you free on request. Your correspondence is invited.

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SIRVENE DIVISION

Chicago 22, Illinois



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SCIENTIFICALLY COMPOUNDED ELASTOMERS

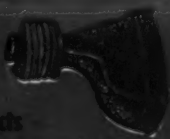
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MAKING STEEL THAT MAKES A DIFFERENCE IN RINGS

By making its own steel in five open hearth furnaces, the Standard Steel Works Division constantly controls the steel in its forged rings and flanges. A combined yearly capacity of 200,000 tons of carbon and alloy steel are made by the acid open hearth method. This process makes possible more definite control of chem-

ical reactions, assuring steel high in quality and tensile properties.

Thus one big reason why you should always call Standard for rings and flanges is the fact that Standard is able to produce and control the analysis and physical properties of the steel going into its products.

ONE OF SIX REASONS why you should always call Standard Steel for rings and flanges

1. **Quality Steel**—through production of own steel by acid process.
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4. **Capacity**—unsurpassed ability to produce weldless rings all the way up to 144" O.D.
5. **Experience**—produced by skilled workmen with 20 to 40 years experience.
6. **Fast Service**—a vital factor in the continuing growth of Standard Steel for over 150 years.

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Free Publications

Continued

Lappers, finishers

Two new bulletins are available from Michigan Tool Co., one describing the company's rotary gear finisher, the other covering an external lapper. With the gear finisher, internal gears as small as 4-in. pitch diam can be finished; smaller sizes can be handled with a special cutter spindle. The lapper, designed for lapping external gears from 1/2 in. to 20 in. diam, can be used to lap mate gears together, one gear with two laps, or two gears on a cluster with one lap each. *Michigan Tool Co.*

For free copy circle No. 14 on postcard, p. 67.

Industrial dust

Dracco Corp. has issued a new 40-p. product bulletin to help production managers and engineers solve the problem of dust control and recovery problems. It contains sections on the different types of Dracco dust control equipment and its applications. *Dracco Corp.*

For free copy circle No. 15 on postcard, p. 67.

Cranes

All moving parts of Series D Electric Traveling Cranes except for winding drums, cross shafts, and bridge and trolley wheels, operate in oil in sealed housings. Every bearing is either a ball or roller bearing. Bridge and trolley wheels are carried on rotating axles revolving on anti-friction bearings. Control is by variable speed magnetic controllers operated by push-buttons on floor-controlled cranes and by master switches mounted in a new style pulpit operator's cage on cage-controlled cranes. More information is contained in a new bulletin. *Manning, Maxwell & Moore, Inc.*

For free copy circle No. 16 on postcard, p. 67.

Gear reducers

Factual information on Cleveland worm gear speed reducers is contained in a new mailing piece. The leaflet presents on-the-job studies of Cleveland units to show the money savings and increased efficiency of the company's equipment. *Cleveland Worm & Gear Co.*

For free copy circle No. 17 on postcard, p. 67.

Free Publications

Continued

Bending rolls

All Niagara bending rolls are pinch type and all three rolls are power driven. Commercially true cylinders are easily produced from thin sheets to maximum capacity of roll. Longitudinal grooves are provided in rear and lower rolls for forming small diam cylinders in one pass. More details on Niagara bending rolls are contained in a new circular. *Niagara Machine & Tool Works.*

For free copy circle No. 18 on postcard, p. 67.

Water softeners

Troubles caused by using hard water in industrial operations and the economies effected by curing them are thoroughly discussed in a comprehensive 16-p. bulletin, published by Permutit Co. Three basic types of Permutit ion-exchange equipment are described and their uses explained. *Permutit Co.*

For free copy circle No. 19 on postcard, p. 67.

Presses

Verson Allsteel Press Co. has issued a new 24-p. catalog describing its hydraulic presses. Included are straight side, post types, double action, gap frame, horn type and a wide range of special models. Detailed specifications are given for standard models. *Verson Allsteel Press Co.*

For free copy circle No. 20 on postcard, p. 67.

Lighting

General Electric Co. has just issued the latest and most elaborate of its *See Better—Work Better* bulletins. Balanced brightness and sufficient lighting are the main theme of the new leaflet. *General Electric Co.*

For free copy circle No. 21 on postcard, p. 67.

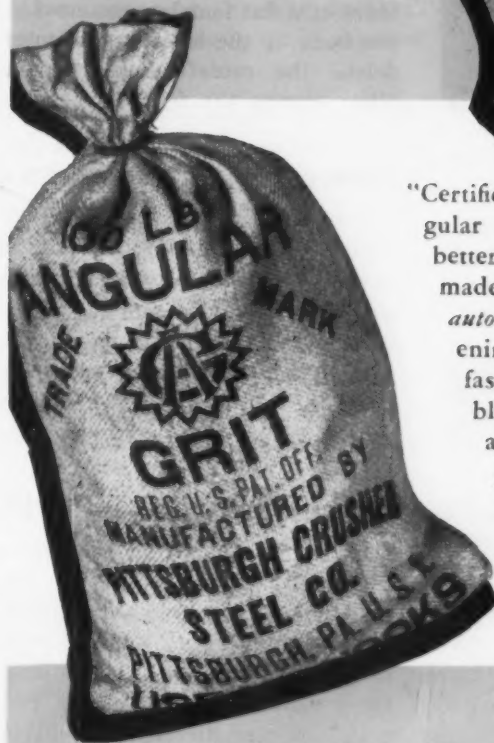
Tachometer

The Bristol Co.'s line of recording and indicating electric tachometers is covered in a 20-p. bulletin. Included are models for measuring speed of rotation or travel, processing time, speed ratios, and sum, difference and average of speeds. *Bristol Co.*

For free copy circle No. 22 on postcard, p. 67.

CERTIFIED ABRASIVES

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"Certified" Samson Shot and Angular Grit wear longer, clean better! That's because they're made *extra-tough* by a special *automatically controlled* hardening process that assures you fast, efficient, high-quality blast cleaning over and over again. Try "Certified" in your cleaning room and you will discover why it is the *first choice* in hundreds of foundries.

All sizes graded to
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Experienced Foundrymen say:

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**PITTSBURGH
CRUSHED STEEL CO.**
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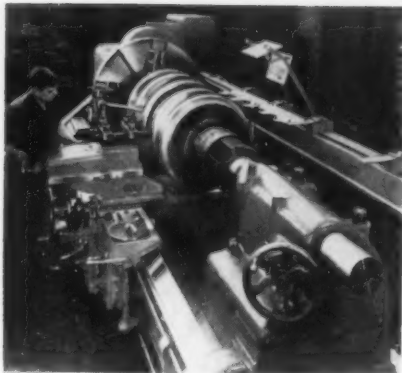


**STEEL SHOT
AND GRIT CO.**
Boston, Mass.

January 8, 1953

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . just fill in and mail the postcard on page 67 or 68.

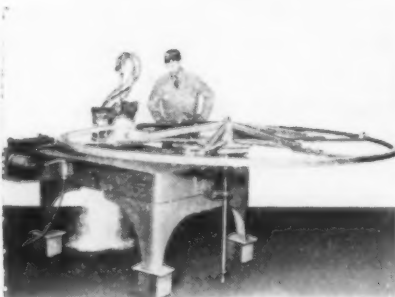


Contour lathe turns steep-angle contours

Two-directional hydraulic tracing makes possible the turning of steep-angle contours on a new 40-in. roll contouring lathe. Two hydraulic motors are automatically controlled through a single valve as the tracing stylus follows the contours of a flat template mounted at the back of the lathe. One motor drives the crossfeed screw, the other powers the feed to the car-

riage. Mechanical power rapid traverse to the carriage and cross slide in both directions is built into the apron. It is claimed that feed and speed can be varied during a cut without interrupting the finish. Cross feed can be by-passed and length feed used separately. Lathe uses 40 hp dc motor. *R. K. LeBlond Machine Tool Co.*

For more data circle No. 23 on postcard, p. 67.

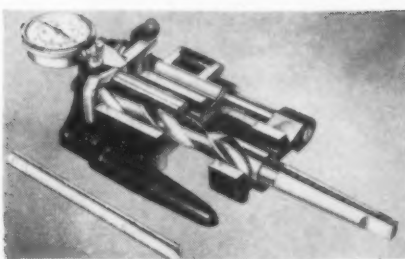


Flame cutter produces gears and sprockets

Three-spindle flame cutter for producing gears and sprockets has the advantage of cutting alloy steel as quickly as mild steel and hardening while cutting with coolant stream. Jury spindle attachment makes it possible to produce sprockets or gears that are bigger than the ma-

chine itself. Multiple spindle design permits automatic production of 3 gears or sprockets at a time, in diameters up to 15 in.; 2 at a time up to 25 in. diam. The unit is said to produce 300 shapes and sizes of teeth. *Cogmatic Co.*

For more data circle No. 24 on postcard, p. 67.

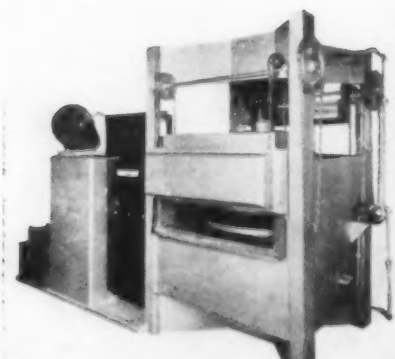


Gage checks twist drill points

The Matrix drill point measuring instrument checks quickly the correct drill point angle and its centrality. Two Vs support the straight and tapered shank drill. On a common indicator dial, centrality is read directly to 0.001 in.

and angle to 1°. This portable unit will insure correct hole size and optimum drill life. Setting standards are supplied for standard drill point angles. Two sizes are available. *Engis Equipment Co.*

For more data circle No. 25 on postcard, p. 67.



Furnace flattens, tempers thin circular pieces

A gas-fired recirculating type furnace has a temperature range from 350° to 1000°F and is used for flattening and tempering large, thin, circular pieces such as circular saws. The burner fires into a combustion chamber on the inlet side of the recirculating fan. The combustion blower is mounted on top of the air duct. A Vickers hy-

draulic unit is mounted on the base at the left. Inside the furnace are two circular cast iron dies 42 in. in diameter. Doors provide easy access from either side of the furnace. Control panel is between the air duct and the furnace structure. *Waltz Furnace Co.*

For more data circle No. 26 on postcard, p. 67.

Turn Page

Wagner

Protected Type Motors

solve tough production problems

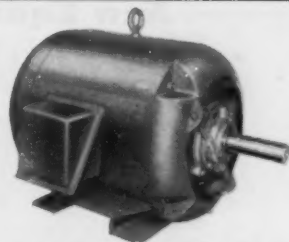
Do you need motors to operate under severe conditions? If you do—you can solve your problem easily with Wagner's complete line of protected type motors.

They are specifically designed for use wherever EXTRA protection is demanded—for bearings or windings... against corrosive vapors or abrasive dusts... in explosive atmospheres or in exposed outdoor locations.

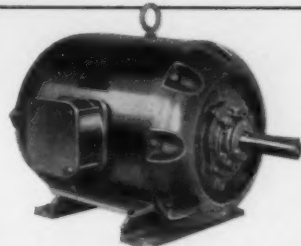
In their specific applications, each of these Wagner Motors assures complete protection of vital parts. Wagner Motors are backed by more than sixty years of motor building experience.

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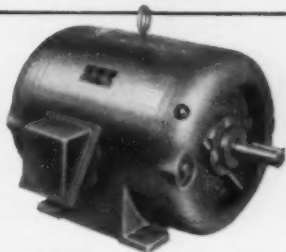
A Wagner engineer will be glad to help you select the correct motor for *your* specific application. Consult the nearest of our 32 branch offices, or write for Bulletin MU-185 for complete information.



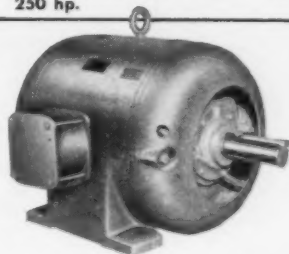
TYPE CP—Totally-enclosed Fan-cooled. Steel frame. 1 to 250 hp.



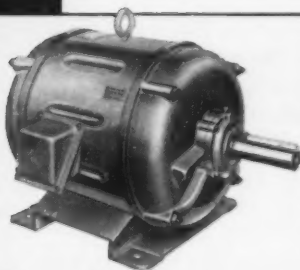
TYPE HP—Explosion-proof. Steel frame. 1 to 250 hp.



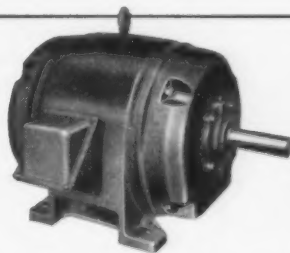
TYPE EP—Totally-enclosed Fan-cooled. Cast iron frame. 2 to 250 hp.



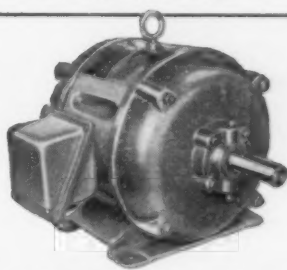
TYPE JP—Explosion-proof. Cast iron frame. 2 to 250 hp.



TYPE RP—Drip-proof. Steel frame. 1/2 to 400 hp.



TYPE XP—Splash-proof. Cast iron frame. 3/4 to 200 hp.



TYPE TP—Totally-enclosed, non-ventilated. 1/4 to 15 hp.

Wagner
Electric Corporation

EST. 1891

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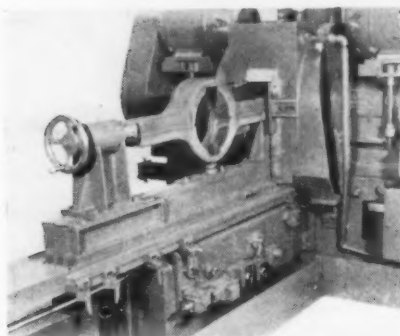
ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

BRANCHES IN 32 PRINCIPAL CITIES

M53-10

New Equipment

Continued

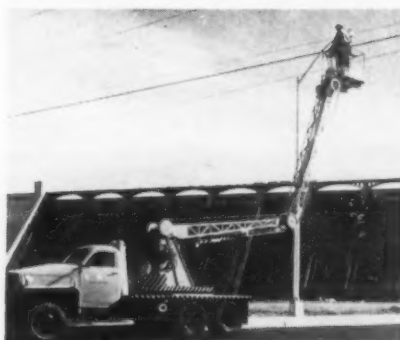


Double spindle machine grinds axle housings

Parallel faces of rear axle housings for trucks are ground on the Gardner double spindle grinder. The machine consists of a heavy cast iron base supporting two opposed grinding heads upon slides with ball bearing ways. Centralized lubrication to the ways is provided. Grind-

ing heads operate hydraulically, permitting taking a face cut. A special fixture supports the axle housing during grinding. Production averages 30 per hr, removing 0.020 in. maximum stock per surface. A tolerance of 0.015 in. for flatness is maintained. *Gardner Machine Co.*

For more data circle No. 27 on postcard, p. 67.

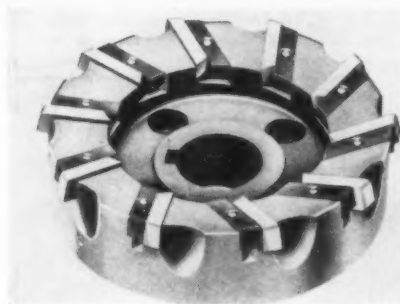


Permits hours of overhead work in minutes

The Hi-Tender is a hydraulically controlled unit consisting of lower and outer masts which elevate the operator into any desired position in off and ground work. It is controlled directly from the operator's cage thus enabling him to move up, down or around to his work. Jointed masts allow easy manipulation

of the operator up and over obstructions into normally inaccessible areas. Hi-Tender reaches out horizontally in radius of 200° and up vertically in excess of 90°. It has speed and flexibility of movement; is engineered for safety and simplicity. *Stemm Bros. Inc.*

For more data circle No. 28 on postcard, p. 67.

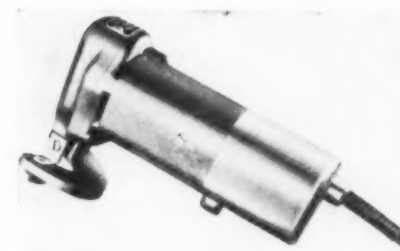


Face milling cutter has interchangeable blades

Improved face milling cutter has only three parts: blade, wedge and screw to be assembled with the steel body. The body is recessed below each wedge to facilitate quick and easy wedge removal. Threads are in the wedges and not in the body. In the event of accident, all damage is absorbed by the

blades and wedges and the body can be refitted to resume work quickly. Solid carbide blades are extra heavy and arranged radially for maximum blade life. New cutter can also be used as a half side mill. Available in standard sizes, right and left hand. *Super Tool Co.*

For more data circle No. 29 on postcard, p. 67.



Electric shears cuts sheet metal

Designed for performance on all types of sheet metal work, the easy-to-handle compact shears made by Scintilla, Ltd., Switzerland, fits the hand perfectly, cuts up to 16 gage sheet metal. Equipped with a guide which permits the cutting of ac-

curate straight lines or curves, this portable power tool weighs 3¼ lb. It is said to be fast in action, doing 3000 cuts per min with a cutting speed of 5 fpm. Operates on dc or ac. *Victor J. Krieg, Inc.*

For more data circle No. 30 on postcard, p. 67.



Coil storage rack has removable tray

Storage space is conserved and equipment made more flexible in a new stacking type coil rack. It has an easily removable tray or shelf that makes it possible to place two rows of small diameter coils, one above the other, in a conventional rack. The shelf has square tubular steel with welded end members. Two longitudinal supporting rails are set at 45 degrees to prevent

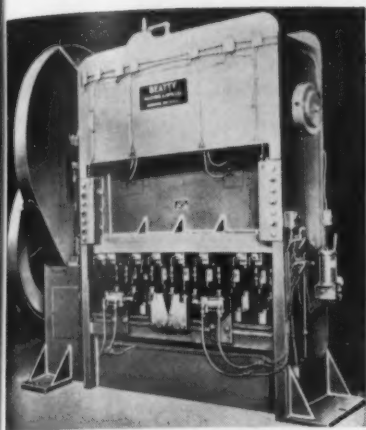
marking the stock. The frame can be lifted out of the rack, manually, making the rack suitable for use in handling larger diameter coils. Rack can be handled by fork truck or provided with lifting eye for sling and hoist. Nesting caps permit safe stacking. *Equipment Mfg. Inc.*

For more data circle No. 31 on postcard, p. 67.

Turn to Page 77

New Equipment

Continued



Angle, plate punch

The No. 10 Guillotine plate and angle punch for punching angles, webs of sections or flat plates has a capacity of 250 tons. It is furnished with tools and positions. Distance between housings is 74 in. Ram is 72 in. long, right to left; 24 in. front to back; and the ram has a stroke of 2½ in. Drive is the mechanical type. *Beatty Machine & Mfg. Co.*

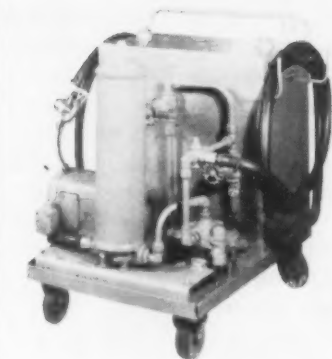
For more data circle No. 32 on postcard, p. 67.



Spring leaf truck

Useful for handling between operations, this multi-tier spring leaf truck is effective where materials should not make contact with each other. Tiers are individually hinged to the heavy-duty upright frame. Each leaf may be locked in semi-up position by two coil springs, one on a side. Rugged steel casters insure maximum mobility; skid base types are available. *Rack Engineering Co.*

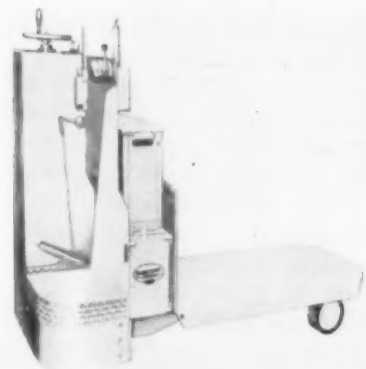
For more data circle No. 33 on postcard, p. 67.



Filter unit

Portable hydraulic filter units are used for pumping hydraulic oil, from a machine, through the filter and back into the machine or into tanks for transport or storage. The equipment has portable tanks of 55 and 20 gal, hose assemblies, Cuno filter, Yale & Towne Model 20 pump. *J. N. Fauver Co., Inc.*

For more data circle No. 34 on postcard, p. 67.



Riding-type truck

New Transveyor riding-type electric platform truck permits 6-ft aisle operation. Compact, lightweight, maneuverable materials handling unit, with 4000-lb capacity, in 6, 7, 9 or 11 in. platform heights; platform lengths vary from 36 to 72 in. Provides load equalization regardless of floor conditions. *Automatic Transportation Co.*

For more data circle No. 35 on postcard, p. 67.

Turn Page

P&H

Arc Welders and Electrodes

put welding in your plant on a low-cost, high-production basis

P&H DC RECTIFIER WELDER

Has Dial-lectric Control for instantaneous heat selection at the work. Three sizes, 200, 300, and 500 amps., NEMA rated.



P&H WELDING TWINS



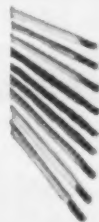
P&H AC WELDER

Has P&H Dial-lectric Instantaneous Remote Control. Sizes up to 625 amps., NEMA rated. Connectable to 220 and 440 volts.

P&H WN-301 Engine-Driven DC ARC WELDER



Portable. Equipped with Dial-lectric Control. Runs at only 1750 rpm. Welding service range, 60-375 amps., NEMA rated.



P&H LOW-HYDROGEN ELECTRODES

13 types that take the problem out of welding high-sulfur, free-machining, low-alloy, and high-strength steels; castings, etc.

Ask your P&H representative or distributor for complete information, or write for free bulletins.



WELDING DIVISION

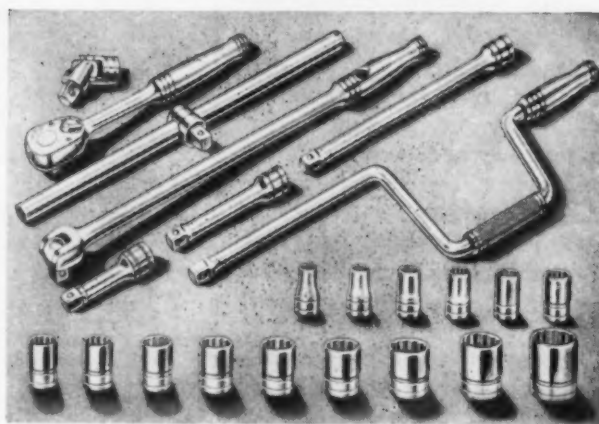
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**Speed Up
NUT TURNING
OPERATIONS**



Snap-on
MASTER SUPREME
WRENCH SET**



■ With Snap-on's Master set you're equipped for an exceptionally wide range of nut turning operations. The four Snap-on handles... Ratchet, Speeder, Spinner, Sliding Bar... with three extensions and universal joint, provide the utmost in wrench flexibility, speed, power... save time on straight-away jobs... quickly reach and turn difficult and "hidden" nuts. Supplied with full range of socket sizes, $\frac{7}{16}$ " to $1\frac{1}{4}$ ".

In thousands of plants Snap-on wrenches are used for production, assembly and maintenance. Write for the Snap-on Industrial Catalog, and general catalog of 4,000 Snap-on hand and power tools.

SNAP-ON TOOLS CORPORATION

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*Snap-on is the trademark of Snap-on Tools Corporation

New Equipment
Continued



Blind rivet

A $\frac{3}{32}$ -in. diam pull through blind rivet for installation by one person from one side of the work has a nickel plated brass sleeve for tacking and fitting up purposes, and for attaching name plates, radio sockets, etc., in close restricted locations. New hand tool for driving $\frac{3}{32}$ and $\frac{1}{8}$ in. diam rivets uses only one hand. *Huck Mfg. Co.*

For more data circle No. 36 on postcard, p. 67.

Reagents

Four new Burrell reagents have been developed for dependable determinations of specified unsaturated hydrocarbons. They are recommended for use with Burrell gas analysis apparatus, but the firm offers its branded solutions as correct adjuncts to modern testing methods with all makes of equipment. *Burrell Corp.*

For more data circle No. 37 on postcard, p. 67.

Cold cleaners

Operating and maintenance costs are said to be lowered with the use of new cold cleaners which remove such soil as heavy drawing oils, pigmented drawing compounds, rust preventives, sulfurized cutting oils, and polar type smuts from ferrous metals, copper and brass. The new Houghton-Clean 439 and 440 combination is used at room temperature in power washers. *E. F. Houghton & Co.*

For more data circle No. 38 on postcard, p. 67.

Turn Page

New Equipment

Continued

Ventilated buff

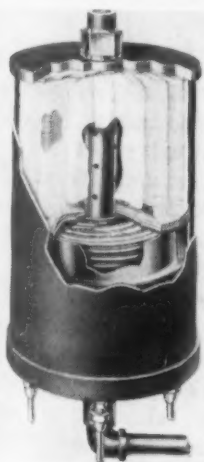
New self-ventilating buff enables faster buffing and reduces buff wear. Known as Ruff-L-Buff, it may be used for hand or machine operations. When two or more are combined to make a buffing wheel, ventilating air enters the wheel through holes in the fiber-board centers of the buffs. As the wheel rotates, centrifugal force drives air through channels to cloth portions of the buff where numerous ruffles distribute the air through the wheel, cooling as it goes. Ruff-L-Buffs are available in standard and heavy duty weights, with 12, 14, 16 and 18 in. OD. *Hanson-Van Winkle-Munning Co.*

For more data circle No. 39 on postcard, p. 67.

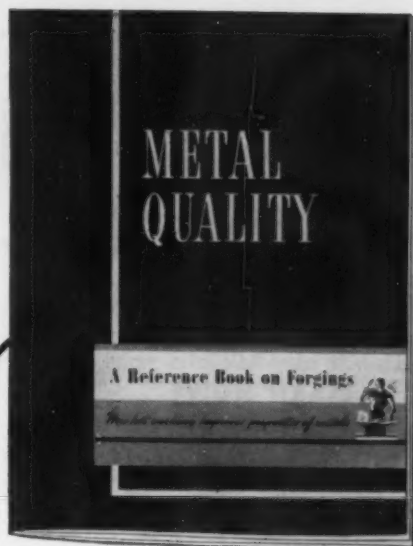
Condensifilter

Compressed air of instrument quality is provided by dehydrating and filtering ordinary plant air in the Model B-30-D Condensifilter. Made of wire mesh, to which flannel is securely attached, the cartridge has a radial fin design which provides over 540 sq in. of filtering area. When the filter becomes dirty, the entire cartridge can be quickly replaced, keeping maintenance time to a minimum. The condensing unit is designed to provide the greatest possible heat exchange area. Trap for discharging accumulated condensate is float-operated, snap action. *Hankison Corp.*

For more data circle No. 40 on postcard, p. 67.



Turn Page



Engineering, production and economic advantages obtainable with forgings are presented in this Reference Book on forgings. Write for a copy.

FORGINGS ARE UNUSUALLY EFFECTIVE FOR SOLVING PROBLEM PART PROBLEMS

A problem part problem, however complex, often ceases to be a problem once all the aspects of the part are checked with the unrivaled economic and mechanical advantages of closed die forgings and the closed die forging process for producing parts. Whatever the nature of problems that make a problem part, consult a forging engineer to determine the extent to which forgings can help you solve them.

DROP FORGING ASSOCIATION

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Please send 60-page booklet entitled "Metal Quality—How Hot Working Improves Properties of Metal", 1949 Edition.

Name
Position
Company
Address

Tiny holes? Easy!

Accurate holes? Easy!

Holes on production schedules? Easy!

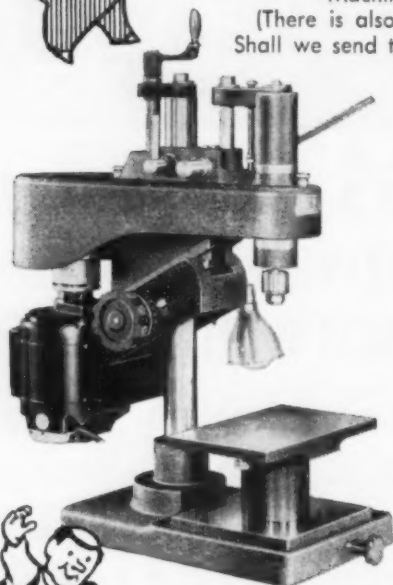
Tiny, accurate holes on production schedules? . . . **WOW!**



Hamilton Drilling Machines can do it!
And withdraw the drill undamaged
from hole after hole after hole!

LEARN HOW!

Write for the series of Hamilton Drilling
Machine Bulletins and Price Lists.
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Shall we send that bulletin along with the others?)



Shown here is the Hamilton
Varimatic, Super Sensitive, Vari-
able Speed, Small Hole Drilling
Machine, one of four models,
each particularly adapted to the
work for which intended, all
equally precise.

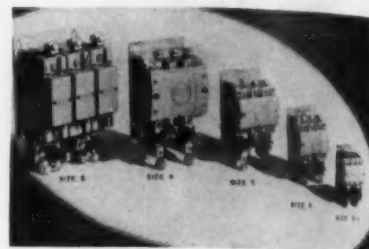


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New Equipment

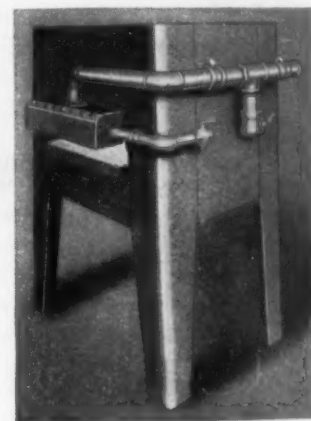
Continued



Motor starter

A new magnetic motor starter fea-
tures vertical overloads below the
contactor. It is designed especially
to be used with the new Crouse-
hinds M52, Type EPC explosion
proof conduit. Much smaller in
size and lighter in weight than con-
ventional controls, the starters offer
a number of advantages: they re-
quire smaller condulets, reducing
initial costs; installation is faster
and easier—two men can hang even
the largest sizes. Lighter, smaller
supporting racks are used. *Arrow-
Hart & Hegeman Electric Co.*

For more data circle No. 41 on postcard, p. 67.



Forge furnace

A new firing method on the Mark-
ley forge furnace protects the oper-
ator from extreme heat. By intro-
ducing gas and air at the slot,
flames are kept in the furnace and
cannot come out the front of the
slot. Neither water nor air curtain
are required. Scale is held to a mini-
mum because of the luminous flame
achieved by the method and rapid
heating is effected because of the
large heat release in proportion to
furnace volume. *Morrison Indus-
tries, Inc.*

For more data circle No. 42 on postcard, p. 67.

Is Your Plant "Well Informed"?

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The Iron Age

SALUTES

Philip McKenna

A creative thinker and planner, he's been solving tough metallurgical problems since his teens.



PHILIP McKENNA was 16 when he invented a method of separating nickel and cobalt. At 19 he developed a process for purifying ferrotungsten. In the years since he has made many other contributions to the field of metallurgy.

These include development of a process for refining ores and other raw materials. He was the first successful commercial producer of cemented carbides for steel-cutting applications.

Now 55, Phil is president of Kennametal, Inc., Latrobe, Pa. The *Who's Who* people list him as a "manufacturer" but he would rather be known as a creative thinker and planner, which he is.

It's like pulling teeth to get Philip McKenna to talk about himself. But he'll open up with little or no prodding on a variety of other subjects ranging from metallurgy to economics.

For one, he is a long-time crusader for a return to the gold standard. As national chairman of the Gold Standard League, he is convinced that reinstatement of the Gold Coin Standard is the answer to many of our present-day problems, including inflation. And he'll back up what he says with facts.

When he wants to relax, Phil tosses his clubs into the back of his car and heads for the golf course. He admits to being just an average golfer but if he ever retires, his friends have been warned they'd better take up the sport if they want to catch up with him.

Case No. 42

Kemp Immersion Heating Gets Top Results for Signode Steel Strapping Company



How Signode Steel Strapping Co. tempers 650 feet of steel strap every minute

At the Signode plant in Sparrows Point, Md., turning out up to a thousand miles of steel strap daily calls for fast, efficient production line techniques. One highly important phase in the final processing is the tempering bath. Here, Signode called on Kemp Engineers to supply the 15 ton, gas-operated Immersion Melting Pot shown above. Now steel strap is uniformly tempered at the rate of 650 feet per minute.

Kemp Offers More Advantages

By installing Kemp Immersion Heating, Signode benefits in many ways. Unlike underfired pots, Kemp pots are *not* subject to *periodic* and expensive shutdowns . . . won't crack or break. They operate con-

tinuously at maximum heating efficiency with a *substantial* savings in fuel costs. Offer a greater heating surface, faster heat recovery, lower dross formation, even lower room temperatures. At the same time, this Kemp unit enables Signode to eliminate costly temperature override and open flame fire hazards.

Let Kemp Solve Your Problems

These same advantages apply to all types of melting or heating operations. Whether you are engaged in tempering, annealing, descaling, coating, etc., you can rely on Kemp Immersion Heating. Why not find out how Kemp Engineers can help you, save you money?

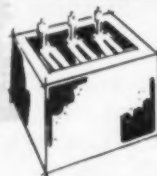


This 10 ton oval pot is typical of the many Kemp installations now in use. Features Kemp Carburetor, part of all Kemp equipment, to deliver complete combustion . . . without waste . . . without tinkering. One-pipe air and fuel feed reduces installation costs, simplifies maintenance.

For more complete facts and technical information, write for Bulletin IE 11 to: C. M. KEMP MFG. CO., 405 East Oliver St., Baltimore 2, Maryland.

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ATMOSPHERE & INERT GAS GENERATORS
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The Iron Age

INTRODUCES

Arthur R. Purdy, re-elected president, A. R. PURDY CO., Lyndhurst, N. J.

William W. Winkler, elected president, DURANT MFG. CO., Milwaukee, succeeding William K. Winkler, who was made chairman of the board.

William E. Judd, appointed assistant to president and board chairman, STEWART-WARNER CORP., Chicago.

William G. Whyte, appointed assistant to the vice-president, U. S. STEEL CORP.

Erwin J. Baumrucker, appointed executive assistant to the executive vice-president, CLEARING MACHINE CORP., Chicago.

R. G. Schrock, appointed executive vice-president, THE EUCLID ELECTRIC & MFG. CO., Madison, Ohio.

C. Howard Paul, elected a vice-president, MACKINTOSH - HEMP-HILL CO., Pittsburgh.

George H. Baker, elected vice-president in charge of Employee and Public Relations Dept., WYANDOTTE CHEMICALS CORP., Wyandotte, Mich.

John W. Brown, elected vice-president in charge of dealer sales, NATIONAL GYPSUM Co., Buffalo; and Wade W. Hildinger, named general sales manager of dealer sales.

J. Roy Barefoot, Jr., elected vice-president, THE FEDERAL MACHINE & WELDER CO., Warren, Ohio.

Harry W. Poole, appointed director of quality control, SUPERIOR TUBE CO., Norristown, Pa.; and Richard L. Hoff, appointed development metallurgist.

W. Walter Jablon, appointed vice-president in charge of sales, DAVID BOGEN CO., New York.

E. Lester Fix, appointed associate director of research, PITTSBURGH PLATE GLASS CO., Pittsburgh; Brooks, J. Dennison, appointed assistant director of research, and Dr. James E. Archer, named assistant director of research.

C. R. Sample and C. S. Petrasch, Jr., named vice-presidents, FORD, BACON & DAVIS, New York; and C. J. Abbott, will become senior vice-president.

Joseph V. Smith, elected chairman of the board and chairman of the executive committee, HUBBARD & CO., Pittsburgh.

Bayard A. Allis, appointed director of public relations, BARIUM STEEL CORP., New York.

William K. Markwell, appointed director of sales, GUNNISON HOMES, INC., housing subsidiary of U. S. Steel.

Francis W. Theis, appointed director of development, Barbarton, Ohio plant, COLUMBIA - SOUTHERN CHEMICAL CORP.

Paris F. Young, promoted to superintendent of the Machine Shop, TEMCO AIRCRAFT CORP., Dallas; and Wilson H. Benson, promoted from assistant superintendent to superintendent of Parts & Tool Control.

J. Rae Strirrat, appointed manager, newly-established marketing research and product planning section, Chemical Div., GENERAL ELECTRIC CO., Pittsfield, Mass.

Haldeman Finnie, elected director, ROTARY ELECTRIC STEEL CORP., Detroit.



GEORGE H. LOVE, named chairman of the board, The M. A. Hanna Co., Cleveland.



JOSEPH H. THOMPSON, named chairman of Hanna Coal & Ore Corp.



IRVING T. BENNETT, promoted to vice-president in charge of manufacturing, Revere Copper & Brass Inc., New York.

Personnel

Continued

Robert Guelcher, appointed industrial engineer, **AJAX FLEXIBLE COUPLING CO., INC.**, Westfield, N. Y.

Gerald D. Fisher, appointed assistant sales manager, Hardware Products Dept., Wickwire Spencer Steel Div., **THE COLORADO FUEL & IRON CORP.**, and **William B. Kempton**, appointed sales manager.

Fred L. Schmidt, appointed senior engineer, environmental test chamber division, **TENNEY ENGINEERING, INC.**, Newark, N. J.

Raymond G. Fisher, appointed director of economic research, **CONTINENTAL CAN CO.**, New York.

Jerry G. Rizzo, appointed manager, Export Dept., **ELLIOT CO.**, Jeannette, Pa.

John Wyman Judson has been appointed quality control supervisor, **ELECTRIC REGULATOR CORP.**, Norwalk, Conn.

W. W. Leonard, appointed assistant manager of Tubular Sales, **THE COLORADO FUEL & IRON CORP.**

L. W. Ben Early, named manager of sales in the Salt Lake City office, **HERCULES POWDER CO.**, Wilmington.

Gerald E. Smart, placed in charge of the plant Engineering Dept., **ALLIS-CHALMERS MFG. CO.**, Norwood (Ohio) Works.

Albert H. Lindsay, appointed manager, newly expanded service department, **NICKEL CADMIUM BATTERY CORP.**, New York.

John W. Thees, named works manager, Toledo Plant No. 1, **DOEHLER-JARVIS CORP.**; and **Charles I. Hodgson**, named works manager, Plant No. 2.

Homer W. Sussman has been appointed general sales manager, **COLUMBIA ELECTRIC MFG. CO.**, Cleveland.

Richard T. Patriquin, appointed New York sales manager, **PENNSYLVANIA FLEXIBLE METALLIC TUBING CO.**, Philadelphia.

Charles A. Frawley, joins the sales staff of **NORTHWEST CHEMICAL CO.**, Detroit.



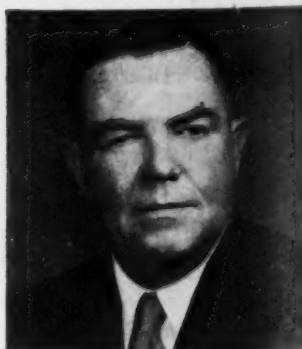
GEORGE SCHWARTZ, named vice-president and treasurer, **Wyandotte Chemicals Corp.**, Wyandotte, Mich.



LOGAN T. JOHNSTON, elected vice-president in charge of sales, **Armco Steel Corp.**

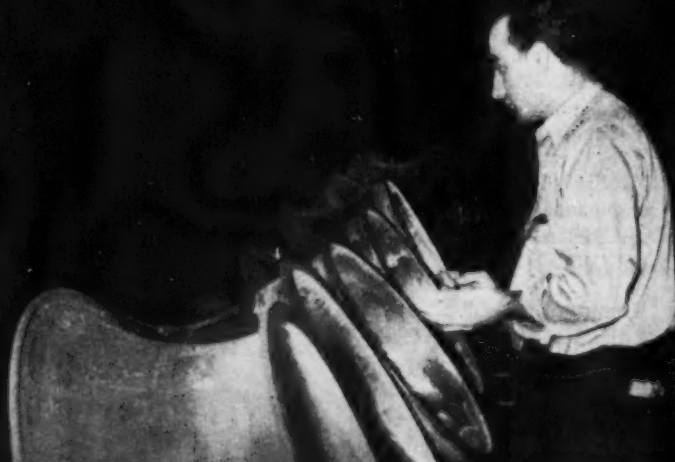


J. H. DOWLING, named assistant vice-president in charge of marketing, **Fallonsbee Steel Corp.**




GEORGE M. CARVLIN, named general manager, Engineering & Construction Div., **Koppers Co., Inc.**, Pittsburgh.

FILLING A GOVERNMENT ORDER. Final shipping inspection of air inlet horns used in jet test cell equipment. An example of the all-gage — all-metal — any quantity — spinning capacity available at Teiner. *Write for newest color brochure*



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"TASK FORCE 'KEOKUK' AWAITING ORDERS, SIR!"

CHIEF KEOKUK: . . . and ready with Electro-Silvery to help industry attack problems of iron and steel production . . .

PRINCESS WENATCHEE: . . . like helping to make the metal that went into this tank and other products vital to the defense program . . .

CHIEF KEOKUK JR: Hey, Pop, what *is* Electro-Silvery?

CHIEF KEOKUK: Electro-Silvery, Son, is a form of ferro-silicon that acts as a vital control element in the production of iron and steel . . .

PRINCESS WENATCHEE: . . . and the largest producer in the world of this vital ingredient is Keokuk Electro-Metals Company!



Keokuk Electro-Silvery is used by foundries and steel plants in the form of these three pigs, weighing 60 pounds . . . 30 pounds . . . and 12½ pounds.



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ELECTRO-METALS COMPANY

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INSTRUMENT MOUNTING



SPLINE TYPE



THIN TYPE



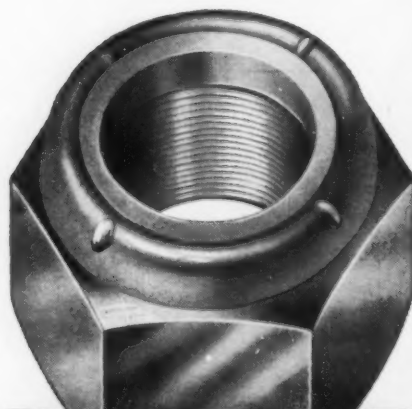
STANDARD

Faster assembly . . . no more failures of fasteners. GREER STOP NUTS hold firm against jolts, shocks, shimmy, wobbles . . . any vibration, any kind.

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GREER

Stop Nuts

Personnel

Continued

J. M. Adler, made assistant manager, New York branch office, JAMES FLETT ORGANIZATION, INC., Chicago.

Ray W. Retterer, appointed administrator of IBM engineering, INTERNATIONAL BUSINESS MACHINES, New York.

Hubert J. McCormick, appointed sales manager, Caldwell plant, LINK-BELT CO., Chicago.

Richard Stockton, appointed district manager, Northeast district, ST. PAUL HYDRAULIC HOIST, Minneapolis.

Philip Del Valle, appointed plant manager, Synchro Div., BECKMAN INSTRUMENTS, INC., South Pasadena, Calif.

Robert M. Griffin, appointed sales representative, Phoenix, Ariz., AUTOMATIC TRANSPORTATION CO., Chicago.

H. J. Van Buskirk, appointed district manager, Pittsburgh area, DEWALT INC., subsidiary of American Machine & Foundry Co.

James P. Gentry, Jr., appointed sales manager, The Standard Electric Div., STANDARD DAYTON CORP., Dayton, Ohio.

OBITUARIES

Edward A. Uehling, 103, founder, Uehling Instrument Co., Paterson, N. J. suddenly.

Joseph Kent Harrison, Sr., 74, widely known throughout the steel industry, and open hearth superintendent at the Ashland, Ky., and Butler, Pa., plants of Armco Steel Corp., suddenly at his home in Butler, Pa. of a heart attack.

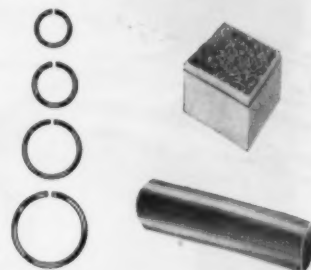
Jervis B. Webb, inventor of mass production equipment and overhead conveyors, at his home in Birmingham, Ala. He was the founder of the Jervis B. Webb Co. and Huron Forge & Machine Co.

William E. Karnuth, 49, district sales manager, Peter A. Frasse & Co., Inc., Syracuse, New York, recently.

Chester O. Barnes, sales manager, Hoist Div., Harnischfeger Corp., of a heart attack in Milwaukee recently.

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CONTRACTORS!
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If your shell, rocket or burster job specifies brazing with Silver Alloy Rings, it will pay you to contact the one manufacturer who completes the job — and at minimum costs.



Alloying to certified Govt. Specifications, rolling, wire drawing and ring forming to your Blue Print tolerances — all these processes performed in one UNITED WIRE mill! Meaning . . . one control — of alloy composition, of precise ring dimensions, of shipping schedules! And . . .

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Eliminate heat checking—

How To Increase Your DIECASTING OUTPUT



By **L. F. Spencer**
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♦ **TREMENDOUS ADVANCES** that have been made in the diecasting field have been due to (1) the introduction of modern mechanical equipment; (2) the improvement of materials used in the manufacture of equipment components; (3) the improvement of alloy compositions used to produce the component diecast parts. The improvement of tool steels for diecasting dies along with the introduction of the more rugged equipment have made it possible to use more extensively the zinc, aluminum, magnesium and copper base alloys. The improvement of a high purity zinc (99.99 pct) has overcome many of the earlier difficulties experienced with diecasting of the zinc base alloys.

Of the modern materials, the zinc base alloys are the most widely used due to the relatively low melting temperature of approximately 750°F. The low pouring temperature has minimized both die cost and maintenance. The castings can be held to very close dimensional tolerances and they are easily machined and finished when so required.

The development of a high purity zinc has overcome the previous difficulties of instability and deterioration precluding the necessity of close control of impurities within the diecast alloy chosen. Both the aluminum and magnesium base alloys have the inherent advantage of being light in weight. In addition, alloys of this type are not sensitive to traces of impurities. They retain their physical properties and dimensions at higher temperatures than the zinc-base alloy types; and sustained loads can be applied to die castings of these metals

Type of diecasting metal and its melting point governs the proper choice of die steel. Heat checking and metal wash of dies can be kept to a minimum by careful selection and heat treatment of dies. By using the right type of steel die insert, one zinc diecasting company increased its die life 1000 pct.

without danger of creep or slow deformation under stress.

In the aluminum-silicon-copper alloys, 85,380 and 384 good castability along with improved machining properties are combined. The latter property being influenced by the copper addition. In the melting range of these alloys, varying from 1100° to 1200°F, such difficulties as heat checking of dies and an increase of core pin wear occur sooner as compared to that experienced in casting the zinc base alloys.

The magnesium diecast alloy, Alcoa Alloy AM263, with a melting point of 1120°F, is somewhat more difficult to cast. Magnesium gains strength more slowly¹ than aluminum while it cools as a casting in the die. Consequently, the tendency of castings to crack must be counteracted by suitable diecasting techniques. The tendency of molten metal to solder to the die is less in the case of magnesium than for aluminum so that the die will usually have a longer life.

Copper-base alloys hard on dies

The copper base alloys as diecastings are limited, chiefly due to their relative high cost. Thus, due to the high casting temperatures ranging from 1600°F and upward, such difficulties as rapid wear and heat checking of dies will be experienced.² Die steels employed to cast the copper base alloys are good from 1000 to 10,000 cycles. This figure given is often exceeded but with a sacrifice on surface finish quality of the finished product. The number of cycles obtainable will be actually dependent

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Diecasting Equipment

**Cold chamber machines are used
for higher melting point metals**

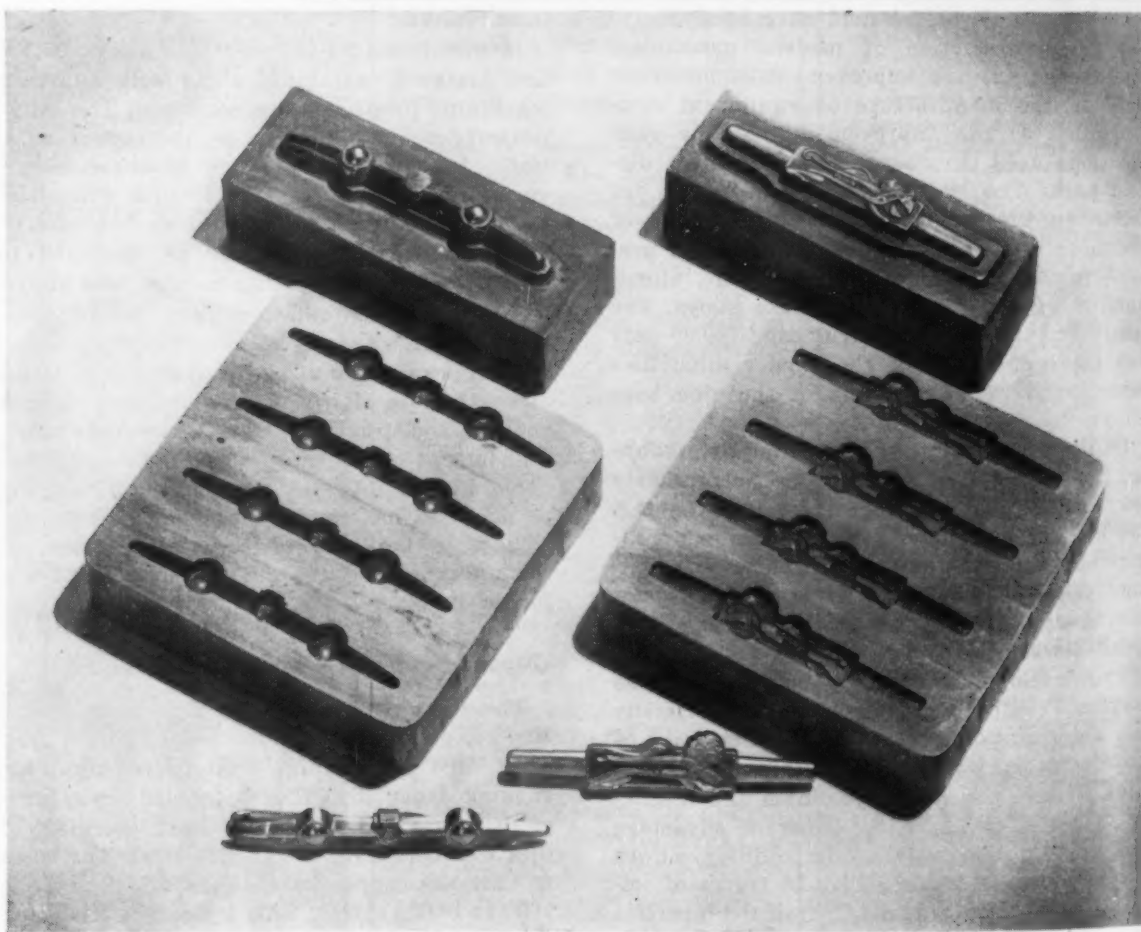
upon the surface finish desired in the completed component.

Both the "goose-neck" and the cold chamber machine are in use for the diecasting of metals; the former type is employed in the production of zinc and, in some instances, aluminum.

About 500 lb psi is the maximum air pressure normally considered practical in the goose-neck chamber which often limits the size casting that can be produced. The cold chamber machine, where pressures ranging from 5000 to 50,000 lb psi can be obtained, is the more frequently employed. The advantages of this type equipment are: (1) the higher pressures pro-

vide a means of injecting the alloy, before it chills, into thin sections or to the remote parts of an intricate casting more rapidly and more completely; (2) the higher pressures provide an effective means in handling difficult casting alloys; (3) the density of the casting can be increased thus minimizing porosity. The cold chamber machines are employed in diecasting the higher melting point materials such as aluminum, magnesium and the copper base alloys. This equipment type is especially necessary in the diecasting of magnesium alloy due to the extreme oxidizable nature of this material.

The chemical composition of the tool steels employed in the shaping of hot metal, for a given diecasting procedure, will vary over a wide range. The type of steel chosen is dependent upon the service conditions encountered on a specific application. The prime selective factor is the temperature to which the die will be heated during its operational life. Thus, the casting of a material within the lead base alloy group, the relatively low operating temperature would only require an inexpensive tool material such as a plain carbon steel. In many instances, it is not necessary to give the completed die a subsequent heat treatment. With zinc base alloys, carbon steel can be employed.



Courtesy: The Bethlehem Steel Co., Bethlehem, Pa.
FIG. 1—Use of type 4 die steel increased production of the necktie clasp shown above by 1000 pct.
Die sections and master hobs are also shown.

TABLE I

POPULAR STEELS FOR DIECASTING DIES

Type Number	Chemical Composition - Per Cent								Diecasting Alloy
	C	Mn	Si	Cr	V	W	Mo	Others	
1	0.43	0.85	0.30	1.15			0.50		Zn base
2	0.70	0.70	0.20	0.80			0.25	Ni - 1.60	Zn base
3	0.50	0.60	0.25	1.00	0.20				Zn base
4	0.07	0.40	0.20	4.50			0.45		Al and Mg base
5	0.35	0.30	1.00	8.00	0.45	1.40	1.50		Al and Mg base
6	0.40	0.30	1.00	5.00	0.90		1.30		Al and Mg base
7	0.40	0.25	1.00	5.25		4.85			Al and Mg base
8	0.30	0.25	0.30	3.50	0.50	9.50			Cu base
9	0.40	0.25	0.25	3.80	0.50	14.00			Cu base
10	0.26	0.25	0.25	3.50	0.50	14.00			Cu base
11	0.32	0.35	0.50	12.00	1.00	12.00			Cu base

Where long production runs are to be anticipated, it is usually good economics to employ an alloy steel such as is exemplified by the chromium-vanadium and the chromium-molybdenum types. Additional benefits are derived by heat treating the die. Care in heat treatment should be practiced and above all, correct records of production life in terms of 'shots' should be maintained. This is of considerable importance when a new die composition is to be compared to a type which has been previously employed. In most shops, this phase

is ignored and the life of any die composition is based on the fragility of memory.

As the higher melting point diecasting alloys are employed, die maintenance increases proportionally while service life decreases. In the casting of both the aluminum and magnesium base alloys, a heat treated steel like the 5.0 pct Cr type is a pre-requisite. The copper base alloys usually require the high tungsten type die steel which will normally have a high red-hardness. Temperature problems in diecasting may be alleviated to some degree by water

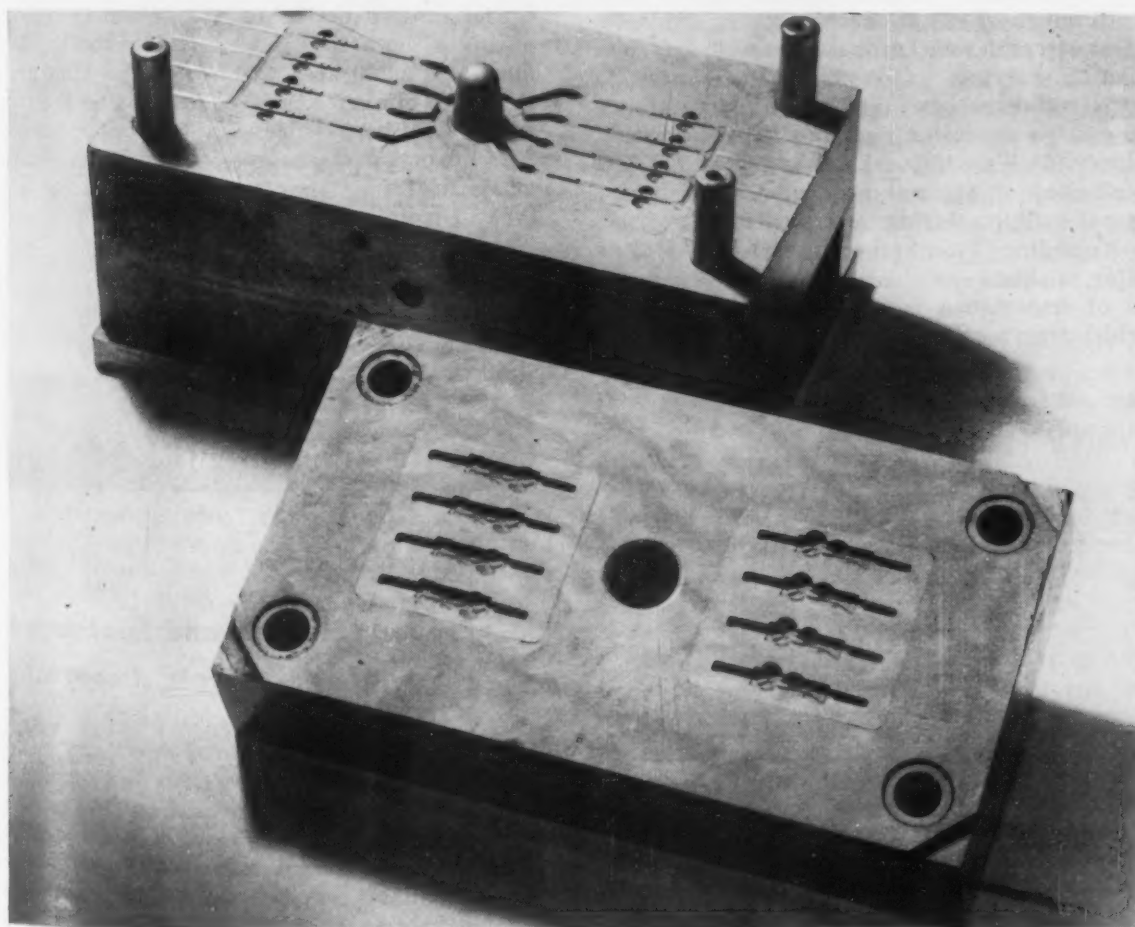


FIG. 2—Finished die with the hobbed inserts in place. Photos courtesy of Bethlehem Steel Co.

cooling the die. However, this procedure is limited by such factors as size and shape of die; design of die; and type of tool material chosen for the die material.

The greatest difficulty that is encountered in diecasting dies, when operated at relatively high temperatures, is that of heat checking. This defect appears as a network of very fine cracks on the die surface which detracts from the appearance of the finished cast section. This defect often causes subsequent difficulties in the finishing operations. This defect is due to the thermal differential that exists between the surface of the die and the inner portion. The resultant differential expansion rate occurs on heating which is followed by a subsequent contraction on cooling. When the combination of these two forces exceeds the elastic limit heat checking occurs.

The tendency toward heat checking cannot be determined under laboratory conditions. The only method of evaluating this factor is by actual service records. Fortunately, an economical production of both magnesium and aluminum diecastings can be realized before heat checking becomes serious. So far, this is not true in the diecasting of the copper base alloys.

Other considerations in die selection³ include the following: (1) structural soundness and uniformity; (2) good machinability; (3) sufficient strength and hardness to resist deformation in service; (4) sufficient toughness to resist cleavage cracking; (5) high resistance to erosion or washing action of the diecasting alloy; (6) high thermal conductivity; (7) low coefficient of thermal expansion; (8) dimensional stability during heat treatment.

Regarding (3), a heat treatment of a selected alloy to obtain sufficient strength and hardness is of importance to resist that deformation which may result by the high closing and cast-

ing pressures normally experienced. Remnants of flash may remain on the die face from previous injections which, if not removed, may contribute to two damaging effects. If the die is harder than 375 Bhn, flash remnants will be squeezed between the matching faces creating a high local pressure. Conversely, if the die material has a hardness less than a 375 Bhn, the flash remnant may be embedded. This resultant peening action may be the cause of poor closing of matching faces and subsequently may require reconditioning. In an extreme case, where the flash metal is adjacent to the edge of the cavity, it may cause a cave-in toward the impression during a casting cycle. The steel compositions having a hardness of 375 to 460 Bhn show a minimum of peening and cave-in.

Cleavage cracking, which occurs to a considerable extent at sharp corners and fillets, is a result of stress concentrations above the tensile strength of the material. The defect first appears as minute cracks which later, upon the repeated application of stress, may develop into a serious fracture. This difficulty can be minimized by selecting a material which has sufficient toughness to absorb these stresses. A more reliable preventative is the use of proper die design so that focal points of high stress are not introduced.

The erosive action of the incoming metal during a diecasting procedure is usually confined to a small area within the die. One procedure to minimize this condition is by the use of inserts if permissible. The 5.1 pct Cr, 1.0 pct Mo, 1.0 pct V steel, indicated by Type 6 analysis in Table I has good resistance to this type of metal wash.

TABLE II
PACKING MATERIAL
How it Affects Surface Carbon

Analysis of Material Tested, Type 5				
Carbon	0.35 pct			
Manganese	0.24 pct			
Silicon	0.90 pct			
Tungsten	1.43 pct			
Chromium	5.10 pct			
Molybdenum	1.55 pct			

Chemical Analysis of Surface Carbon after Exposure				
Method of Pack	Carbon Content, Per Cent*			
	First 0.015 in.	Second 0.015 in.	Third 0.015 in.	Fourth 0.015 in.
Packed in Charcoal	0.56	0.56	0.50	0.43
Cast Iron Chips	0.71	0.64	0.53	0.46
Burned Pitch Coke	0.35	0.35	0.35	0.35

* The center carbon of each specimen was 0.35 pct. C.

How To Increase Your DIECASTING OUTPUT

Die Steels

Proper selection and heat treatment of die steels important.

The die steels given in Table I are conveniently classified in the right hand column by usage for different type casting alloys.

The compositions given in Table I are a good cross section of what materials are commercially available as die material in this particular field. However, there may be other compositions available which will be variations to the analyses given.

Type 1, a tool steel used for zinc diecasting dies, is frequently purchased in the heat treated condition at a hardness of approximately 300 Bhn. At this hardness, the analysis will machine quite readily. It has sufficient alloy to provide air hardening properties capable of producing a hardness of 275 to 325 Bhn in sizes as large as 20 x 10 in. upon cooling in still air. While this material is not a hobbing steel, in the strict sense of the term as applied to the very low carbon steels, hobbled impressions in the annealed material can be produced. It is usually necessary to inter-space hobbing operations and stress anneals to obtain sharp impressions. This is particularly true where medium depth impressions are to be produced. Stress relief is usually done at 1300° to 1350°F for a time period varying from 1 to 3 hr.

For short runs use types 2 and 3

Types 2 and 3 are similar in application to Type 1. Type 3 is chosen usually for short service. In this case, it may be used in the as-rolled or heat treated condition, and works best at a range of 217 to 255 Bhn. In this condition, the steel is readily machinable and may be easily polished. Where long production runs are expected, a hardness of approximately 388 to 400 Bhn is recommended. This can be obtained by quenching in oil from a hardening temperature of 1600°F followed by 900°F tempering. Due to the low carbon content of Type 3 analysis, it is not susceptible to decarburization under normal handling conditions.

Heat treat type 4 for best service

Type 4 is truly a hobbing material having the characteristic low carbon content along with sufficient alloying elements to give it the desirable properties in the heat treated condition. This type composition has been used with considerable success in the diecasting of zinc novelty necktie clasps.⁴ This specific application has resulted in a 1000 pct increase in die life than had been obtained with a normal type hobbing steel. The hobbing was performed on the annealed material, which had hardness of 109 Bhn. The operation was performed in one push in a 300-ton press. The die sections, the master hobs and the completed item are illustrated in Fig. 1. In this specific instance, hardening of the die section is obtained by air cooling directly from the carburizing temperature of 1700°F. The finished die with the hobbled inserts are illustrated in Fig. 2.

There is little choice between Types 5 and 6a, both have similar properties in the hardened condition. However, Type 6 is the more popular grade due to its better machining properties. These compositions, which have been quite successful for aluminum and magnesium diecasting dies, exhibit very little size change in hardening and are free from any tendency to warp or distort during heat treat-

TABLE III

RESULTS ON GAS NITRIDING

(a) Nominal Composition of Material Nitrided, Type 6.			
Carbon	0.40 pct		
Silicon	1.00 pct		
Chromium	5.00 pct		
Molybdenum	1.00 pct		
Vanadium	1.00 pct		
(b) Results upon Nitriding.			
Cycle	Depth of Nitrided Case, Inches	Case Hardness, Rc	Core Hardness, Rc
24 hr.	0.007	72	49
48 hr.	0.012	73	47
72 hr.	0.019	74	45

Note: Case Hardness converted to Rc from 15-N Rockwell superficial test.

ment. Blocks that were 16 x 14 x 4 in. thick, were flat within 0.0005 in. after receiving a standard hardening treatment.⁵ In addition, full hardness can be obtained with both composition types, even in large sections. On the same size block, which was cooled in still air from 1850°F, a uniform hardness of Rc 52 was obtained. Specimens as large as 30 in. in diam, weighing 2800 lb upon air cooling from 1900°F have a hardness of Rc 44.

Pack hardening of the completed die to prevent objectionable scaling and sweating is preferred. A suggested packing material is pitch coke that has been heated to remove the volatile matter wherein a mesh size of 6 to 8 is recommended. Pitch coke does not shrink on heating so there is no danger of the die becoming exposed. The importance of using a correct packing material cannot be over-emphasized. Hot work dies of this analysis may fail early from heat checking by the presence of either carburization or decarburization products on the exposed surfaces.

In this regard, results indicated in Table II are of interest. The purpose of this test was to determine the carburizing effect of the materials listed when employed as a packing material. The specimens employed for the test were approximately 3½ in. sq x 6 in. long. Each section was packed in a container so that the steel was surrounded by approximately one in. of packing material. Each box had a rod inserted through the center to determine when the steel reached the quenching temperature. All the boxes were pre-heated at one time at 1500°F and were held at this temperature for two hr to assure complete soaking. The boxes were then transferred to another furnace operating at a temperature of 1850°F. It took approximately one hr and 25 min to reach this temperature, after which they were held for two hr for complete soaking followed by a furnace cool. From the results indicated, both charcoal and cast iron chips compare unfavorably to burnt pitch coke.

Complete soaking is essential at the harden-

Nitriding improves die life and prevents sticking of the casting to the die cavity.

ing temperature with most of the high alloyed materials. The presence of complex chromium carbides will require sufficient soak so as to obtain complete solution which insures a better service life. A tempering temperature from 1050° to 1150°F. is usually employed. A hardness Rc 47 to 50 is recommended for diecasting dies handling molten aluminum.

The use of nitriding to produce a high skin hardness on diecasting dies is controversial, however there is no question as to the benefits of this type of heat treatment for slide-ways or other wear members. It is often desirable to nitride diecasting dies to improve die life and to prevent sticking of the casting to the die cavity.⁶ The results of gas nitriding a Type 6 composition is given in Table III. Sections tested were 1/2 in. sq hardened at 1850°F and drawn at 1050°F. The samples were ground and gas nitrided as given above.

The analysis represented by Type 7 is an established performer in the diecasting of both aluminum and magnesium base alloys. The tungsten content increases the hot working properties of this material and provides great resistance to both heat checking and washing. Air hardening is preferred so as to keep distortion to a minimum. Hardening in either a controlled atmosphere furnace or pack hardening in a suitable compound to prevent surface chemistry changes is preferred. Slow preheating and transfer to a high heat of approximately 1850°F is recommended. A hardness of approximately 555 Bhn should be obtained upon air quenching.

Type 8 shows good toughness

The tempering operation should follow as soon as the die reaches 150°F. The tempering temperature is between 1050° to 1100°F for a time period of approximately four hr for every inch of thickness.

Composition Type 8 has many of the characteristics of high speed steel, however it possesses greater toughness than the conventional higher tungsten high-speed steels. It will withstand temperatures up to approximately 1100°F without reduction of the maximum hardness attained after heat treatment and will resist higher temperatures without loss of hardness when previously subjected to an equally high tempering temperature. Water cooling dies of this composition, when operated at the higher temperatures, is not usually recommended. The exception to this is where the design will permit a continuous circulation through the die.

This analysis type is used for the casting of

copper base alloys. Improved service can be had if this analysis is pre-heated prior to actual diecasting. Hardening in a controlled atmosphere furnace is desirable, however, if an open furnace is employed, precautions should be taken to prevent decarburization and scaling. A pre-heat with a soaking period at this temperature is preferred as is the case with all high speed steels. Soaking at the quenching temperature is not recommended. A pre-heat temperature of approximately 150°F is used which is followed by a high heat of 2100° to 2150°F. A dry air blast cool is preferred. A tempering temperature of from 1000° to 1250°F is employed, the choice of temperature being governed by the ultimate operating temperature of the die in service. In diecasting steels, a double temper is almost mandatory; the second temper being from 25° to 50°F lower than that employed in the first temper. This practice gives maximum heat checking resistance.

Preheat types 8 and 9

Both Types 8 and 9 should be pre-heated prior to hardening with sufficient soaking at the pre-heat temperature of 1500°F. Type 9 is air quenched from a temperature of 2100° to 2200°F and followed by a double draw of 1250° and 1200°F respectively. This tempering practice is essential where maximum resistance to heat checking is desired.

Composition Type 10 has a very low carbon content and as a result, the maximum hardness obtainable is relatively low. An Rc 42 hardness is ordinarily obtained when quenched from 2150°F whereas 46 is obtained when quenched from 2300°F. In this specific case, where pack hardening or annealing is required, care must be taken so as to protect the surface from carburization.

Preheating at a temperature of approximately 1550°F is recommended for Type 10 after which the die is transferred to a hardening heat of approximately 2300°F. An air cool is preferred to minimize warpage. Double tempering is preferred, the tempering temperature varying between 1250° and 1350°F. In a conventional heat treatment, whether it be hardening or annealing, care should be exercised in protection from undesirable surface reactions.

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The pressure's on—

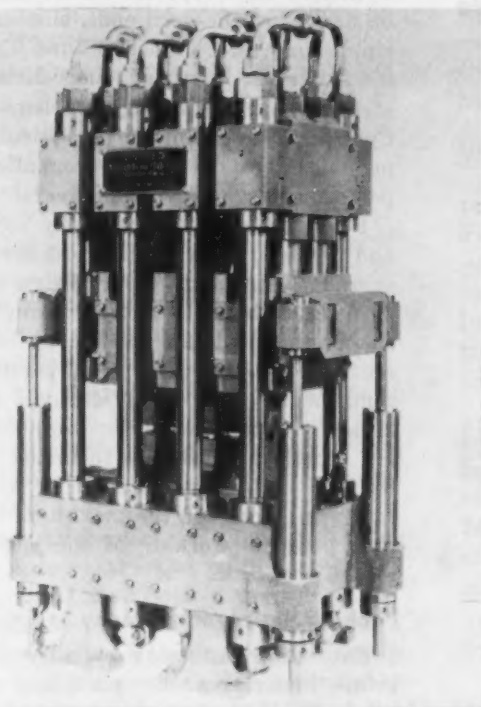


FIG. 1—Model of 35,000-ton hydraulic forging press designed by United Engineering & Foundry Co., Pittsburgh.

BIG PRESSES Tax Design Ingenuity



By M. D. Stone
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United Engineering &
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Some 400,000 tons of heavy press capacity is being added to the national productive machinery under sponsorship of the United States Air Force. These great machines will be unique and potent factors in earlier output of high speed aircraft parts. Extraordinary size, great pressures and load factors peculiar to hydraulic die forging and extrusion operations have presented unusual problems in press design.

♦ **GROWING VALUE** of large presses in production of high speed aircraft has led to the present great expansion of press plants under sponsorship of the United States Air Force. Many heavy hydraulic die forging and extrusion presses are under design and construction, Table I. Some 400,000 tons of heavy press capacity will be added to the national capacity at a cost of close to \$400,000,000.

Extraordinary size and pressures, and unusual mechanical and metallurgical requirements were presented in design of these presses. Some design possibilities and trends, with particular reference to the 35,000-ton vertical die forging presses, the 20,000-ton extrusion press and other large presses now under construction at United Engineering & Foundry Co. are represented.

There are significant differences between open forging and die forging presses. The latter, because of the high specific pressures required to fill the dies, especially for light thin-walled sections, are considerably greater in tonnage capacity relative to platen area. The 35,000-ton die forging press in question has a platen area of

24 x 12 ft corresponding to about 120 tons per sq ft. A 14,000-ton open forging press built in World War II, has a platen area of 23 ft x 8 ft, 6 in. corresponding to about 70 tons per sq ft. Open forging presses must permit rapid stroking and accurate position control. These are of no concern in a die forging press where velocity control during stroking is of first importance.

The 14,000-ton open forging press mentioned has a maximum clear distance between bolsters of 24 ft. The current 35,000-ton die forging presses will have 15 ft daylight max. Earlier die forging presses were slow, having idling speeds of 2 ips and pressing speeds of 1 ips. Newer presses will reach open forging press speeds of 10 ips idling and 2½ ips under full pressure. The requirements of planishing, at up to 50 strokes per min for large open forging presses, are not met in the die forging press where cycle operations faster than 1 per min are rare.

With some exceptions, use of single-piece forged columns has demonstrated many advantages. Forged columns have been used at United for presses from 500 tons capacity up. Their use

"Provision has been made for adding two opposed 5000-ton side cylinders . . ."

is probably limited to presses of 75,000 tons capacity and less.

An exception is the 8000-ton single-cylinder press being built for Alcoa. The small platen area relative to capacity, corresponding to a specific figure of 250 tons per sq ft, plus the need to withstand full pressure eccentric loading of $\pm 2\frac{1}{2}$ ft the long way and $\pm 1\frac{1}{4}$ ft the short way of the press suggests a cast rigid frame press construction.

The 35,000 ton press has eight cylinders and eight columns, essentially four 2-column press units, see Fig. 1, as far as the top entablature is concerned. This permits full proportional stressing of all columns. The units, free to stretch vertically independently of one another,

yet keyed and bolted against lateral movement. Cylinders are supported at the top, rather than on flanges at the open ends, eliminating a recurring source of cylinder failure. Cylinder stress condition is improved and distortion associated with packing leakage problems is minimized. Cylinders have pintle-type articulated rams to prevent lateral distortions from affecting packing performance and cylinder wear.

Forged columns serve dually as press column and pressure piping. The press is clear of heavy surrounding piping. Clean design is achieved by locating both prefill and operating valves below the press and handy to the operator. Columns must be properly designed, particularly as to refinements in thread design, and securely attached to top and bottom entablatures. Standard practice at United is to shrink them between top and bottom nuts at initial loading significantly in excess of the maximum forging loads. This prevents working of the joints under continued operation.

Packing maintenance easy

Ease of maintaining cylinder packing is of prime importance. By providing excess cross-head stroke, the entire cross-head may be lowered below the nominal low position, to give access to internal packings.

Columns require special replacement considerations in the case of failure due to material flaws. To avoid 60 ft of additional height over the press as well as comparable crane accommodations, top entablature castings have side caps which may be removed for insertion of a new column. Only 15 ft extra height is needed.

These presses will not be furnished with side cylinders but provision has been made for adding two opposed 5000-ton side cylinders. Four 250-ton ejector cylinders are furnished for die forging work, three in the base and one in the moving cross-head. Overriding both if necessary, is adequate stripping capacity in the press proper, when using prefill water for raising the platen,

TABLE I

HEAVY PRESS PROGRAM

Designer and/or Builder	Size, In Tons	Type	Operator
Baldwin-Lima-Hamilton Co.	25,000 35,000	Die forging Die forging	Harvey Machine Co., Torrance, Calif. Kaiser Aluminum, Newark, Ohio
E. W. Bliss Co.	25,000	Die forging	Kaiser Aluminum, Newark, Ohio
Hydrex Co.	50,000 35,000 20,000 12,000 8,000 8,000 8,000	Die forging Die forging Extrusion Extrusion Extrusion Extrusion Extrusion	Wyman-Gordon Co., Worcester, Mass. Wyman-Gordon Co., Worcester, Mass. Alcoa, Lafayette, Ind. Curtis-Wright, Caldwell, N. J. Kaiser Aluminum, Halethorpe, Md. Kaiser Aluminum, Halethorpe, Md. Reynolds Metals Co., Phoenix, Ariz.
Lombard Corp. (Built by United)	12,000	Extrusion	Reynolds Metals Co., Phoenix, Ariz.
Mesta Machine	50,000	Die forging	Alcoa, Cleveland
United Engineering & Foundry Co.	35,000 35,000 20,000 8,000	Die forging Die forging Extrusion Die forging	Alcoa, Cleveland Harvey Machine Co., Torrance, Calif. Harvey Machine Co., Torrance, Calif. Alcoa, Cleveland
Schlenemann (Germany)	13,200 15,000	Extrusion Die forging	Alcoa, Lafayette, Ind. (Now being installed) Alcoa, Cleveland (In operation)

TABLE II

SOME BIG PRESS STATISTICS

35,000 Ton Forging Press		20,000 Ton Extrusion Press	
Platen area	24 x 12 ft	Cylinders, 4000 tons each	8
Daylight, max.	15 ft	Pullback cylinders	2
Idling speed	10 ips	Columns, 31½ in. x 70 ft.	4
Pressing speed	2½ ips	Column weight, approx.	200,000 lb
Forged columns, 34 in. OD x 60 ft.	8	Weight of biggest casting, approx.	425,000 lb
Column weight, approx.	200,000 lb	Max billet size	32 x 60 in.
Heaviest castings, approx.	450,000 lb	Press length	122 ft
Main cylinders	8	Length with runout table	275 ft
Ejector cylinders, 250 tons each	4	Press height	26 ft 3¼ in.
Press weight, estimated	5000 tons	Total press weight, estimated	3500 tons
Auxiliary equipment, approx.	1500 tons	Auxiliary equipment, estimated	2000 tons

to free any stuck forging. Higher ejector capacity is provided in the bottom of the press because the major part of all cavities will be confined to the lower die. The three cylinders will be operated by three separate cylinders mechanically equalized so the full 750 tons can be exerted on a single chunky piece or distributed over long pieces.

The die manipulator table, essentially the bottom bolster, is 24 x 12 x 2 ft. It rides on wear plates, provided with central sliding keys and locking cylinders, and operated by a pair of 250-ton oppositely acting cylinders. Care must be taken to allow for temperature expansion of the sliding manipulator, as a result of thermal conduction from the heated dies, which approach 600° F at their faces. However, these dies may be 4 ft thick, with thermal barriers provided so that bolster temperatures should be well below half these values.

Dominating considerations throughout the design of large presses are the maximum weight and dimensions that may be cast, machined, and transported, Table II. These large 35,000-ton presses will have several castings weighing up to 450,000 lb and yet of such dimensions that they may be shipped. About two-thirds of the total press weight will be castings, cylinders, column nuts, major bolts, and the like. Maximum weight of forging used is 200,000 lb—the weight of the 34 in. OD x 60-ft long alloy steel columns. Estimated total weight of the press is 5000 tons. Auxiliary equipment add another 1500 tons.

Secondary stresses set up by eccentric forging may easily exceed primary stresses due to central forging. The USAF has recognized the importance of permissible eccentricity of forging as a factor in design specification. Designs require full pressure be exerted ± 2 ft off center along the long axis of the press, and ± 1 ft off center in the lateral direction. Thus, provision must be made for a 70,000 ton-ft eccentric moment, in addition to full central pressure of 35,000 tons.

The uncertainty of being able to count on the eccentric moment being properly shared by all eight columns, led to adoption of the hydraulic method of eccentric moment equalization. As shown in Fig. 2, due to the nature of the work being forged, the pressure, P , of the main cylinders A , may be called upon to overcome the metal resistance as some distance away, e , thus tending to rotate the cross-head out of parallel and away from the horizontal.

Two equal area double acting cylinders are cross-connected with the fluid locked in the circuit. As the cross-head tends to move out of level under action of the eccentric moment, P_e , fluid pressure is set up in the closed circuit. This creates a reaction force, R , such that $R_h = P_e$ and the eccentric moment is automatically equalized, without mechanical contact with press columns, etc.

Some limiting factors

This method is limited by the compressibility of the lubricated water pressure medium, the extensibility of the pipes and cylinders under pressure, and the possibility of fluid leakage.

To offset these factors, equalizing and lifting cylinders are combined in one, the cylinders connected in parallel during idling up and down, and in series, when pressing. Four cylinders are used, one in each corner of the platen—cross-connected diagonally, providing for eccentric loading in any direction.

In the hydraulic equalization system the eccentric moment is equalized by vertical forces only. This lack of significant side forces means that no substantial loads on the guide pins can exist, because the cross-head is free to float laterally (except for some small locating lateral hydraulic cylinders)—and hence guide pin difficulties are expected to be minimized or eliminated.

Eccentric condition indicator

Continuous visual indication of the magnitude and direction of any eccentric condition during forging is available to the operator. A spot of light on a ground glass screen, plays over a diamond-shaped limit area having a 2 ft half-major axis and a 1 ft half-minor axis. From experience the operator can learn how much and in what direction he may shift the dies to minimize eccentric forging conditions.

Most presses now being built use direct pumping plus air accumulators. The hydraulic medium for hot-working open, die forging and extrusion presses, is water admixed with a small percentage of soluble oil to prevent rusting. In case of leak a fine spray of oil on the heated dies or forging would present a serious fire hazard if straight mineral oil were used.

Multi-cylinder reciprocating pumps, with either individual cylinder synchronized unloaders or overall automatic pump by-pass valves, are preferred.

Higher speed 5 or 7-cylinder vertical pumps,

TABLE III

TWO FORGING METHODS COMPARED

Part—Form	Drop Forged Weight in lb	Press Forged Weight in lb
Billet.....	19.35	14.46
Forging.....	18.60	12.88
Finished machined.....	10.55	10.55
Metal removed by machining.....	8.55	2.83
Fuel consumption.....	66.2 of steam	0.42 kw hr

"In some cases die life ranges from 50,000 to 75,000 forgings per die set . . ."

often directly connected to shaft mounted synchronous motors are used. Rapid idling, upward and downward is usually provided by a low pressure prefill system around 100 psi. This pressure also serves as positive suction pressure for the main pressure pumps.

Pumps sizes ranging from 200 to 500 gpm, at 5000 psi driven by 600 to 1500 hp motors predominate, even where total pumping capacities of 1500 to 2000 gpm are involved. Hydropneumatic accumulators ranging from 2500 to 7500 gal are preferred. Lower investment cost, less valving and piping, and lower maintenance results. All such systems must have overflow sumps, sump pumps, system water coolers, low and high pressure air compressors and receivers for accumulator charging.

Usually sufficient accumulator capacity is provided to keep the system pressure drop within 10 pct under the longest stroke requirements. For extrusion presses, where pressure requirements usually decrease with stroke, the 10 pct may be taken as a reduction in press capacity, only 90 pct being available at the end of the stroke.

In forging presses, particularly die forging presses, where pressure requirements usually rise toward the end of the strike, the 10 pct should be added to the rated capacity, i.e., 100 pct should be available at the end of the stroke.

As to relative die life, considerable compara-

tive experience has been had on smaller parts, such as pistons and connecting rods. In some cases die life ranges from 50,000 to 75,000 forgings per die set, compared at 1000 to 5000 per die set for drop forging. Absence of impact in press forgings and the possibility of using cast dies instead of forged dies have distinct production possibilities. The need for rapid ejection when hammer forging requires draft angles of from 5° to 7°. For press forgings, draft angles of 3° down to 1° or less may be used, depending on the depth of cavity. This results in considerable weight savings.

Since dies are kept in alignment by guide pins throughout the press forging stroke, and due to reduced forging tolerances because of decreased mismatch further weight reductions are possible. Temperatures cannot be held closely in drop forging where a 200° F difference in top and bottom dies on a piece 20 ft long corresponds to a mismatch of more than 1/4-in.

Less metal used

A small wheel hub, formerly drop forged and now press forged, illustrates possible weight and machining savings. Table III shows a reduction in billet weight of 25 pct, and an even greater reduction of 67 pct in the amount that is necessarily removed by machining. Even here, however, a 14.48 lb billet was required to make a 10.55 lb finished part, an excess material requirement of 37 pct.

Great forging pressures are built up, especially in thin-walled panels. Friction between die face and work piece can have tremendous effects on these required pressures.

Pressures required to forge a narrow rectangular panel, Fig. 3, as compared to a circular

WHY HYDRAULIC FORGING?

Experience on the 18,000 ton die forging press at the U.S.A.F.—Wyman-Gordon plant, compared with drop forging experience, showed these advantages for the hydraulic press:

- (1) Greatly extended die life through elimination of impact effects.
- (2) Only small draft angles are required due to a one-stroke operation plus use of ejector facilities.
- (3) Closer dimensional tolerance can be maintained, as dies are held in alignment during the complete forging cycle.
- (4) Predetermined die temperatures can be maintained on both the upper and lower die, resulting in less shrinkage and mismatch factors.
- (5) Production rates can be approximately doubled, especially on larger and heavier forgings.
- (6) Complicated forgings requiring undercuts and internal bores can be produced.

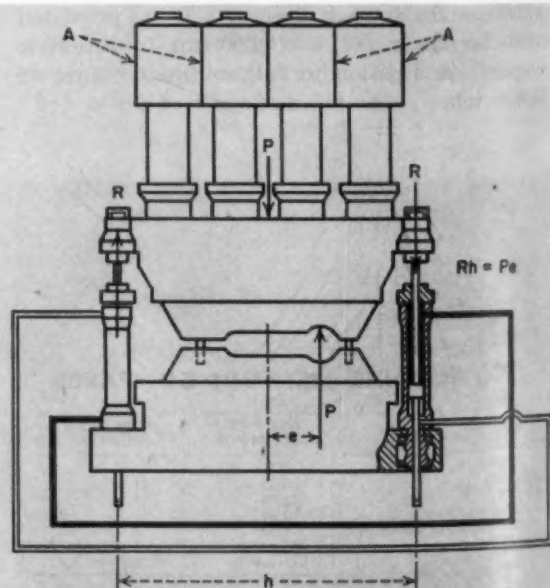


FIG. 2—Two double-acting cylinders provide press equalization under eccentric forging loads. Fluid, in black, is locked in circuit.

panel of the same thickness, may be twice as great. This is caused by constraint to flow in one dimension. Ratio of diameter to thickness plays an important part in increasing the required forging pressure, but no less so than the value of die friction. If there were no friction at these interfaces, it would be as easy to forge a thin panel as a thick one. Thus continued research on ever better lubricants for die forging application is of prime importance.

When average pressures reach ten times the yield stress, peak pressures in the center area of the disk may reach 50 times the yield point. Under these high compressive stresses, press die distortions are unavoidable.

A 35,000-ton press, on a forging requiring 60,000 psi average pressure, can produce pieces only 4 x 2 ft. Even over these relatively small panels, thicknesses are far from uniform. To mitigate such variations, the press crossheads, platens and entablatures must have maximum bending rigidity. However, the calculated bending deflections of the platen and base entablature under the most concentrated loading conditions, 35,000 tons on a die base area corresponding to a 58-in. diam circle, are less than 0.010 in. over the length of the forging.

The real causes of forging inaccuracies—incomplete filling of dies—are compressive deformations (all within the elastic limit) of the dies, bolsters, platens.

In general, the most rigid die forging presses that can be constructed are still subject to considerable deformation under high forging pressures. The term "precision" forging must be interpreted accordingly. By trial and error methods, compensation for such deformation can be made in the die design to provide properly tap-

ered die faces which will yield essentially constant thickness planes.

Similar design problems are met in construction of the 20,000-ton extrusion press being built as a part of the USAF program. Because of its great capacity, full tonnage is provided by five 4000-ton cylinders. Four act directly on the main cross-head, and the fifth acts as a separate piercer or additional main cylinder, at the choice of the operator.

In extrusion pressures in excess of 125,000 psi are encountered, where the basic yield stress of the aluminum alloy may be only 12,500 psi. Friction effects in the billet container and pressure increases involved in the extrusion process account for pressure multiplication.

Extrusion pressure, with no container friction, is a function of the extrusion ratio A/a , where A is the area of the billet container and a is the area of the extruded section, Fig. 4. Thus, care must be exercised in not using too large a press (i.e., container and billet) for a small extrusion.

Limits also exist as to the minimum section that can be extruded in a given press. At start of extrusion, when billet length may be considerable, required pressure is at its maximum. As billet length decreases, extrusion pressure drops to a minimum value. Due to increasing resistance to radial inflow of the residual billet butt toward the die aperture, no press can exert enough pressure to extrude the entire billet.

Any reduction in container friction would effectively decrease the maximum tonnage required and points up the need for improved lubricants.

This article is based on a paper presented before the American Society of Mechanical Engineers.

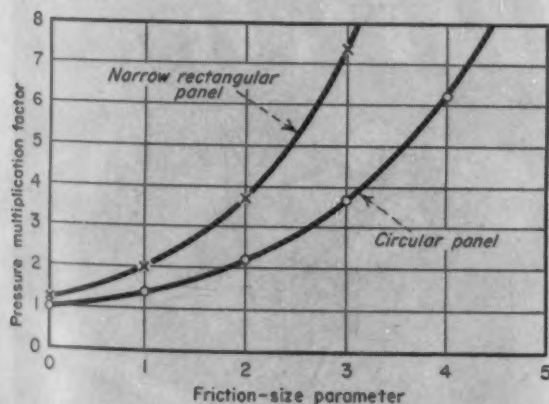


FIG. 3—Pressure multiplication factors in forging of thin panels. Parameter is based on friction co-efficient between dies and work piece multiplied by length of the work piece in., and divided by the thickness of the work piece in.

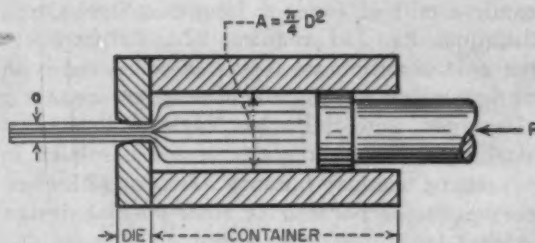


FIG. 4—Ram pressure, P , for extrusion is a function of the ratio A/a , where A is the area of billet container and a the area of the extruded section.

Fast test—

Automatic pipe tester CUTS INSPECTION COSTS



By J. B. Delaney
Pittsburgh Editor

From 20 to 30 pct less manpower is needed to operate Jones & Laughlin's new fully automatic hydrostatic pipe testing unit at Aliquippa, Pa. Testing, formerly done on a manually operated machine, has been reduced to seconds. Average test cycle is about three pieces per min. Maximum production is 1500 pieces per 8-hr turn on 2 $\frac{3}{8}$ in. OD. Most operating cylinders are water actuated. Sequence is electrically controlled. Down time has averaged between 10 and 15 pct and is expected to be lower as crews become more familiar with equipment.

♦ REDUCED manpower requirements is one advantage of fully automatic pipe testing in the seamless mill of Jones & Laughlin Steel Corp., Aliquippa, Pa. J&L requires 20 to 30 pct fewer men on the automatic tester as compared with the manually-operated machine it replaced.

Designed and built by Taylor-Wilson Co., Pittsburgh, the hydrostatic tester has been in operation since last January. Ideas of J&L engineers are incorporated in some special design features.

Test range is 2 $\frac{3}{8}$ to 7-in. OD, in lengths of 16 to 50 ft. Average test cycle speed is nearly three pieces per min. Maximum production is 1500 pieces per 8-hr turn on 2 $\frac{3}{8}$ -in. OD and 1000 pieces on 7-in. OD. A larger tester, now being installed, will have a range of 5 $\frac{1}{2}$ to 14-in. OD.

On production runs, the test cycle on 2 $\frac{3}{8}$ -in. OD is 16 sec; on 7-in. OD, 25 to 30 sec.

Operating features of the tester include:

(1) For smooth operation and control, nearly all operating cylinders are actuated by water.

(2) An interlocking system of operation, electrically controlled, guarantees a proper sequence in the operating cycle. For example, water cannot enter pipe under test unless both ends are covered by test heads.

(3) Test heads are supported by oil-filled cylinders that prevent backward movement when pipe is under pressure.

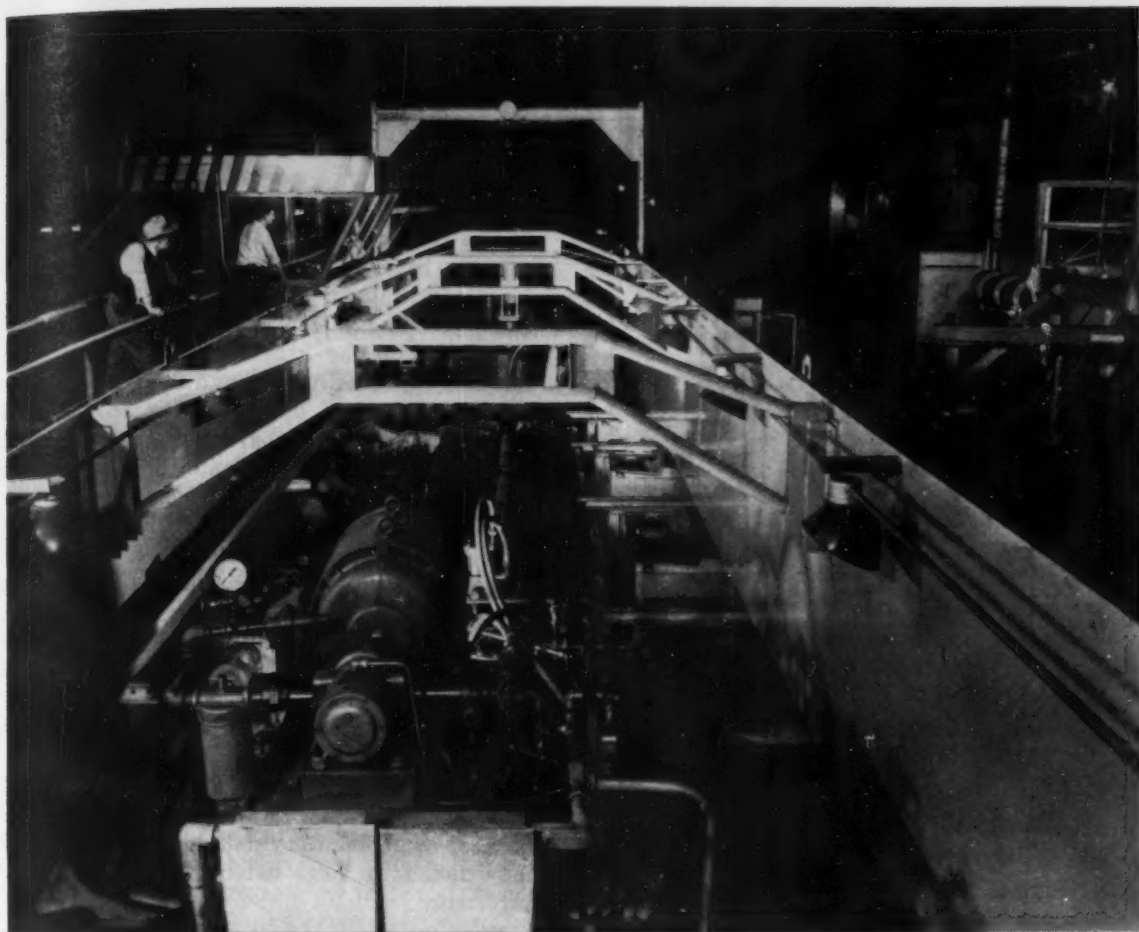
First step in operating cycle is automatic placement of pipe on alignment table where it is mechanically positioned. Pipe is then rolled into tester by feed levers. After pipe is clamped, test heads move over both ends. Test pressure is held for 5 sec, then released. After test heads move back to clear ends, pipe is kicked out of tester onto skids leading to coating machine.

Test water is recirculated between a pit equipped with baffles to remove scale, and a pit holding filtered water. Emulsifying oil is used to prevent rusting and to lubricate valves through which tester water passes. An Adams water filter removes particles of 0.005 in. diam.

Method of aligning pipe for testing eliminates



CLOSEUP of automatic pipe testing machine at Aliquippa Works of Jones & Laughlin Steel Corp. Control panel at left.



LONG VIEW of pipe tester showing section under test. Operator has full view of test piece at all times.

lost motion of carriage on which test head is mounted. As the pusher on the alignment table comes forward to press the pipe against a stop on the carriage end, it carries with it a set of cams traveling on two rails. When the pusher returns to its back position the cams remain behind.

As the pipe is fed into the tester, the travel of the test head or carriage is controlled by limit switches tripped by the cams. The cams are then returned to the back position, and the cycle is repeated when the succeeding pipe section is brought up for testing.

J&L has developed a water seal of rubber composition that has been very satisfactory. The seal is in the form of a standard U-cup packing, except for a spring molded into the cup at the point where the rubber is most likely to extrude past the pipe.

Down time for maintenance has averaged between 10 and 15 pct, but this is expected to improve as crews become more familiar with mechanical and electrical equipment.

Making a size change requires four operations: (1) Replacing the test head on each end. (2) Changing the coupling gripper on each end. (3) Changing the "V" blocks on which the pipe rests. (4) Adjusting kickoff fingers. Time con-

sumed is approximately 1 hr. Additional time is required for minor adjustments.

There are two water pumps in the main hydraulic system. Both are Bingham pumps. One is driven by a 75 hp motor and delivers 900 gpm at 150 psi. The other pump is driven by a 300 hp motor and delivers 150 gpm at 2000 psi.

On the oil hydraulic system are two Dennison pumps driven by 10 hp motors producing approximately 20 gpm at a working pressure of 2000 psi. To keep the pump size down, two Vicker accumulators were added to each pump, thus providing the volume of high pressure oil needed to operate the tester.

Intensifiers are double acting, and test pressure can be held for any desired time, even with a leak in the system. The double intensifier acts as a reciprocating pump.

To prevent tester heads from moving back while the pipe is under pressure, a large oil cylinder carries the test head on each end. As the head moves out, a large surge valve allows oil to flow into the oil cylinders. When the head reaches the end of its travel the surge valve closes, trapping the oil in the cylinder at the same time the pullback cylinders move back against this trapped oil, eliminating backward movement of the test heads.

No room for argument—

NEW MOTION TIME METHOD DEFINED



By H. C. Geppinger
Supervisor, Time Study Training
Construction Materials Div.,
General Electric Co.
Bridgeport, Conn.

A new system used in detailing and measuring the production methods in manufacturing a home appliance has resulted in considerable savings for General Electric Co. Called Dimensional Motion Times, it is constructed on the basis of terms which are more clearly defined and specified. Common motions which recur in any operation are directly related and expressed by dimensions in inches. They refer to distance, part size, target size and clearance. The time values designating any particular motion are positive. Concise dimensional terms require only a small number of explanatory and defining rules, since they deal to a large extent with factual measurement. In developing the method about 350,000 test runs were made on nearly 1,000 samples.

◆ EARLY LAST YEAR General Electric Co. completed its first survey, analysis and standards application using a new system of motion times. The system has been applied to all operations in the manufacture of a home appliance.

During a three month period about 300 operations ranging from 0.04 to 2.0 min per cycle were analyzed. Processes and incidental handling element were improved and an authentic record of methods, details, and methods measurement was obtained.

Appreciable savings due to the application of sound motion principles and stabilization of methods in general, are an expected result of this type of operation analysis. However, the most important factor in achieving cost reductions was the system used in detailing and measuring the production methods. Called Dimensional Motion Times it differs from most other systems in that it is constructed on the basis of terms which are more clearly defined and specified.

The series of motions which make up a common or basic motion cycle include: the empty hand reaching for an object, fingers closing on the object to gain control, the hand moving with the object to the fixture, placing the part on another object or fixture, and fingers opening to relinquish control of the object. In the DMT system these motions are designated as: TE, transport empty; G, grasping; TL, transport loaded; P, position; RL, release.

For the common motions TE, G, TL, and P, which most frequently re-occur in any operation the terms are directly related and expressed by dimensions in inches and refer to distance, part size, target size, and clearance. The time values designating any particular motion are positive. They cannot be denied, guessed at, or argued. This facilitates application of the system and gives a much greater assurance to uniformity of application by a group of analysts. Concise dimensional terms require only a small number of explanatory and defining rules since they deal to a large extent with factual measurement.

Grasping times vary

By eliminating word descriptions and the factor of judgment in selection of a motion value, the newly developed system assumes a more scientific aspect. Broad averages for specifying conditions of work are carefully avoided by developing a research approach which permits only one variable in each series of test cycles.

The research project, therefore, was carried on in great detail with an equitable number of samples and under closely controlled specifications and conditions. About 350,000 test runs were made, recorded and analyzed on nearly 1000 test samples from September 1949 to December 1951. The project also included producing and analyzing 300 laboratory films and numerous test applications to known shop operations to reconcile and verify the data at several stages of the project.

The variations in grasping times due to part sizes, and in positioning times due to the target diameters and clearances, are illustrated by the tabulated data for two bushings, see Fig. 1. All dimensions required for selecting the values from the tables are shown in conjunction with the part sketches. The cycle consists of grasping a bushing from a supply tray containing many jumbled parts at random and moving and positioning the bushing in an open round nest.

Since distances and the nature of RL are identical, the differences in the cycle times are

entirely due to the different sizes of parts and the component fixture. Changing any of these physical features, either the part size, positioning point, clearance, depth of nest or contact edges would affect the operation time. If these features are known and systematically recorded, as they are under this system, a program of cost reduction can be effectively carried on through methods and design economy. The difference in grasping times required for parts of different sizes and shapes are shown in Fig. 2. These grasping times apply when parts are furnished jumbled in trays.

In addition to major new developments in the use of motion times, the project also explored many other motions occurring with manual operations. Consideration had to be given to the effect of weight and transports in restricted areas. Values had to be determined for typical cases of finger manipulation and prepositioning. Tabulations had to be made for grasping isolated parts and for various other typical work elements, which are always performed in conjunction with each other. Some of these values had to be classified by descriptive terms, while others, revealing a definite relationship to measurable units, were specified by dimensions.

Method simplifies checking

A better understanding of the system and its practical use may be obtained by an examination of the DMT methods analysis of a simple riveting operation. This standard form shown on p. 108 provides spaces for a sketch of the bench set-up (see Fig. 3), identification data, part sketches and for recording of the method. The columns headed "code" refer to identifications of the table from which the time values were selected and also denote the particular item. The layout sketch gives information about the arrangement of parts around the riveting machine, fixed transport distances and pin and hole dimensions. The assembly parts with dimensions appear to the left of the analysis data in order of assembly. This method of recording information was adapted to facilitate and simplify checking or reviewing of motions and time values.

To conserve time and space, decimal points and zeros have been omitted in the posting of time values. Values are therefore expressed in ten thousandths of a minute; a value shown as 48 actually denotes 0.0048 min and a value of 106 indicates 0.0106 min. When motions are performed simultaneously, one of the time values, either equal or shorter than the other one, be-


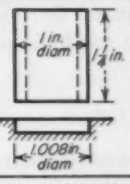
BASIC MOTION CYCLE FOR TWO BUSHINGS		
DESCRIPTION OF MOTIONS		
	Clearance 0.002 in.	Clearance 0.008 in.
1 TE to tray 16 in.	58	58
2 G part from tray	74	47
3 TL to nest 16 in.	58	58
4 P in nest	77	43
5 RL part	8	8
TOTAL	275	214
Cycle time in min	0.0275	0.0214

FIG. 1—Variations in grasping and positioning times due to part sizes and target diameters and clearances are shown in the basic motion cycle above.

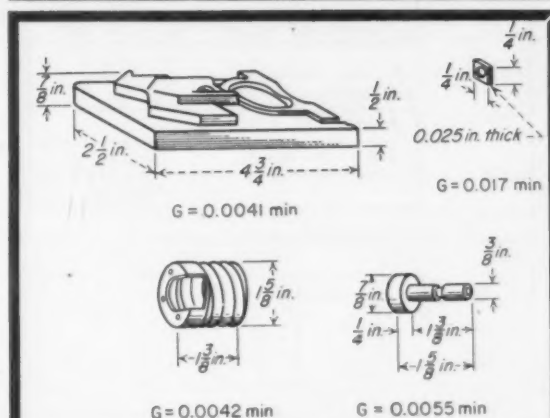


FIG. 2—Differences in time required to grasp different sized parts. The larger the part the less time is required. Units are in thousandths of a min.

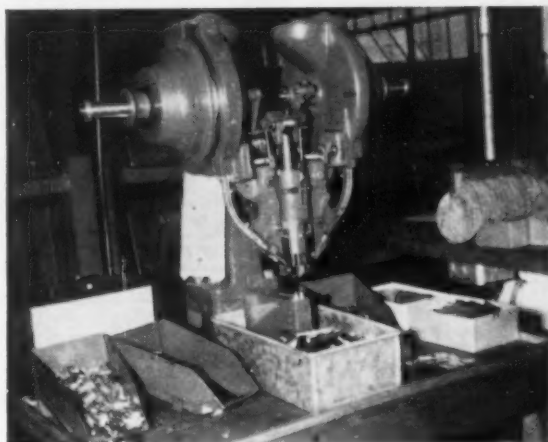


FIG. 3—Bench setup and equipment used in riveting operation. Operation is described in DMT—methods analysis form. Sketch of arrangement appears on form.

comes non-chargeable. Circling such values draws attention to the analyst of omitting them when each elemental column is totaled. The operation time is then determined by an addition of the elements as noted at the bottom of the methods analysis sheet.

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<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">OPERATION <i>Assm. & Rivet</i></div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"><i>Bi-Metal</i></div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">PART NAME:</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">APPARATUS: <i>Tubular Rivetter</i></div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">(After rivetting, part drops in tray below)</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">OPERATOR: M (F)</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">ANALYST:</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">DATE <i>7-18-52</i> Sect.</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Dept.</div>	<div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-between;"> DRG. NO. CAT. NO. </div> <div style="text-align: center; margin-top: 10px;"> </div> <div style="text-align: center; margin-top: 10px;"> </div> </div> <div style="margin-top: 10px;"> Pin 0.094 in. Holes 0.100 in. </div>																																																																																																																																																			
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Bi-Metal</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Bracket</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Brass Plate</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>Insulation</p> </div>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 25%;">LEFT HAND</th> <th style="width: 10%;">CODE</th> <th style="width: 10%;">TIME</th> <th style="width: 10%;">TIME</th> <th style="width: 10%;">CODE</th> <th style="width: 40%;">RIGHT HAND</th> </tr> </thead> <tbody> <tr> <td colspan="7" style="text-align: center;"><i>I. Assemble bimetal and bracket</i></td> </tr> <tr> <td>1</td> <td>TE to tray</td> <td>T 10 B</td> <td>(48)</td> <td>48</td> <td>T 10 B</td> <td>TE to tray</td> </tr> <tr> <td>2</td> <td>G bracket</td> <td>J 25 B</td> <td>94</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="7" style="height: 20px;"></td> </tr> <tr> <td>7</td> <td>Direct turn</td> <td>DT 3</td> <td>75</td> <td>(8)</td> <td>R L 2</td> <td></td> </tr> <tr> <td>8</td> <td>TL to fixture</td> <td>T 4 B</td> <td>31</td> <td></td> <td></td> <td></td> </tr> <tr> <td>9</td> <td>P to 1st pin</td> <td>P 2 A</td> <td>70</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>2nd pin</td> <td>P 6 A</td> <td>40</td> <td></td> <td></td> <td></td> </tr> <tr> <td>10</td> <td></td> <td>R L 2</td> <td>8</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="3"></td> <td>318</td> <td>+335 =</td> <td>653</td> <td></td> </tr> <tr> <td colspan="7" style="text-align: center;"><i>II. Assemble brass plate and insulation</i></td> </tr> <tr> <td>11</td> <td>TE to tray</td> <td>T 12 B</td> <td>(51)</td> <td>51</td> <td>T 12 B</td> <td>TE to tray</td> </tr> <tr> <td colspan="7" style="height: 20px;"></td> </tr> <tr> <td>19</td> <td></td> <td>R L 2</td> <td>8</td> <td></td> <td></td> <td></td> </tr> <tr> <td>20</td> <td>TE to edge of bench</td> <td>T 10 B</td> <td>48</td> <td>(48)</td> <td>T 10 B</td> <td>TE to edge of bench</td> </tr> <tr> <td>21</td> <td>TRIP PEDAL</td> <td>Ft.</td> <td>65</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="3"></td> <td>368</td> <td>+329 =</td> <td>697</td> <td></td> </tr> <tr> <td colspan="3">Tot. elem. I</td> <td>653</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="3">elem. II</td> <td>697</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="3">Total per unit</td> <td colspan="4">0.1350 min</td> </tr> </tbody> </table>		LEFT HAND	CODE	TIME	TIME	CODE	RIGHT HAND	<i>I. Assemble bimetal and bracket</i>							1	TE to tray	T 10 B	(48)	48	T 10 B	TE to tray	2	G bracket	J 25 B	94											7	Direct turn	DT 3	75	(8)	R L 2		8	TL to fixture	T 4 B	31				9	P to 1st pin	P 2 A	70					2nd pin	P 6 A	40				10		R L 2	8							318	+335 =	653		<i>II. Assemble brass plate and insulation</i>							11	TE to tray	T 12 B	(51)	51	T 12 B	TE to tray								19		R L 2	8				20	TE to edge of bench	T 10 B	48	(48)	T 10 B	TE to edge of bench	21	TRIP PEDAL	Ft.	65							368	+329 =	697		Tot. elem. I			653				elem. II			697				Total per unit			0.1350 min			
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A new addition to the popular "Directory of Tool Steels and Carbides" is this description of individual brands. This supplements the directory listings in the January 1, 1953, issue.

ADAMAS CARBIDE CORP.

Adamas A A straight tungsten carbide for general purpose machining primarily on cast iron and nonferrous material combines high wear resistance with toughness.

B Tough shock resistant grades for general purpose machining and heavy duty including intermittent cuts on cast iron and nonferrous material.

C Steel cutting grades for finishing and light roughing as well as boring and milling. Wear and crater resistant. Contains tungsten carbide plus titanium carbide.

D Strong general purpose steel cutting grade tough and moderately wear resistant containing titanium carbide.

AA Hardest and most abrasive resistant Adamas straight tungsten carbide used for light finishing cuts to close tolerances and for boring.

BB The strongest and most shocked resistant Adamas straight tungsten carbide for cutting tools used at slow speeds and coarse feeds and interrupted cuts.

CC Steel cutting grade containing titanium carbide. Hardest grade for boring and machining to close tolerances.

DD A steel cutting grade of carbide containing titanium carbide; strongest most shocked resistant of Adamas steel cutting grades for heavy roughing cuts.

HD-20 Impact grade for cold heading and wear parts. Contains straight tungsten carbide. Also available with tantalum as HDT-20.

HD-25 Impact grade for large hole heading dies and extreme shock conditions, maximum strength and toughness. Contains straight tungsten carbide and also available with tantalum carbide as HDT-25.

Allegheny Ludlum Steel Corp. Carmet Grades

CA-1 Possesses high transverse rupture strength (toughness). For general purpose machining of all types of steel, or when user is not experienced with carbides. CA-1 is best for impact, vibration, interrupted cuts, coarse feeds, and deep cuts when roughing soft steel. Since it takes considerable abuse, it may be used with deep chip-curling grooves, in older machines which operate at slow speed, and where there is limited tool support.

CA-2 Harder and not as tough as CA-1, with resultant higher resistance to wear. For light roughing and finishing of all types of steel, but is limited to light, interrupted cuts. CA-2 may be used for faster speeds than CA-1 when cuts and feeds are lighter.

CA-3 For cast iron, nonferrous metals and non-metallics. Tougher than CA-4 below. It is a general purpose grade and most desirable for an inexperienced operator. Because of its higher strength and lower hardness, CA-3 will withstand intermittent and roughing cuts on the above materials.

CA-4 is lower in toughness but harder than CA-3. It is, therefore, more resistant to wear, although less resistant to shock. The selection of CA-4 is indicated for faster and lighter finishing than with CA-3. It may be used for rough-machining softer metals at moderate speeds and for light, interrupted cuts.

Both CA-3 and CA-4 are primarily for machining cast iron, nonferrous metals and non-metallics. However, they may also be used for light finishing cuts on steel.

CA-5 Tougher than CA-1. For machining steel at slower speeds and with heavier feeds, or to withstand more impact, vibration and interrupted cuts. It is not as hard as CA-1, nor as wear-resistant.

CA-6 Harder but not as strong as CA-2. It has greater resistance to wear but less resistance to shock. It is best used on light, precision finishing cuts on steel.

CA-51 is the strongest Carmet grade that is used for cutting tools. Typical applications are for tools of high speed planers on cast iron or "semi-steel" castings; and for turning tools when heavy, interrupted cuts are taken in steel with speeds lower than normally recommended for carbide tools. It is particularly desirable for blanks used in "Clamped-on" rigid holders.

CA-7 is higher in hardness but lower in strength than CA-4. It is used where greater wear resistance but less shock resistance is required, such as light cuts on unusually hard cast iron. Grades CA-7, 8 and 9 are for machining cast iron, nonferrous metals and non-metallics.

CA-8 is less tough but harder than CA-7. It is used where high resistance to wear is required for light, precision cuts.

CA-9 is indicated for close tolerance finishing on soft non-metallics, and for long tool life on fine-grained irons.

CA-10 is used for light duty blanking dies and punches, deep drawing die inserts and punches, light shock wear application or light impact. It is generally used on mine tools. This and the following three grades are for punches, dies and wear parts with impact or shock.

CA-11 is lower in hardness but stronger than CA-10. It is used for lamination blanking punches and dies on silicon steel, heavy shock wear applications, or medium impact.

CA-12 is harder than but not as strong as CA-10, although stronger than CA-3. It is used for heavy duty turning on cast iron, light duty mine tools, and deep drawing dies.

CA-20 is the Carmet grade with the lowest hardness and highest strength. It is used for heavy impact.

Armstrong Bros. Tool Co.

Armie (Red) Carbide tipped cutters for machinery steel.

Armie (Gray) Carbide tipped cutters for machining cast iron, nonferrous metals and non-metallics.

Carboloy Dept. General Electric Co.

831: (tools) For precision steel finishing and high speed finishing cuts where close tolerances are held. Resists wear better than grade 78 but is not as shock resistant. High wear resistant. Contains WC, Co, TaC and TiC.

78: (tools) For finishing and light roughing steel. Adaptable for practically all types of steel. Medium shock resistant, high wear resistance, Contains WC, Co, TaC, and TiC.

78B: (tools) General purpose steel machining. Recommended as the best grade with which to start when the user is not experienced in machining steel with carbides. Used to some extent on Monel and nickel steels. Medium high shock resistant, medium wear resistant. Contains WC, Co and TiC.

78C: (tools) Heavy duty, interrupted cuts in steel. Recommended for machining steel parts on large, heavy duty machines, such as 9 to 12 ft boring mills and 36 to 48 in. lathes. High shock resistant, low wear resistant. Contains WC, Co, TaC and TiC.

Directory of Carbides—Continued

999: (tools and dies) Precision finishing. Resists abrasion of centrifugally cast iron and alloy irons. Low shock resistant, high wear resistant. Used in precision finishing and in small wire dies. Contains WC and Co.

905: (tools) Finishing and light roughing. Makes possible finishing cuts to close tolerances. Used for light finishing cuts on alloy cast iron with hardness up to 550 Brn. Medium low shock resistant, medium high wear resistant. Contains WC, Co, TaC and TiC.

883: (tools) General machining, close limits. Used for roughing, finishing and also for one cut finishing. Can also be used for light finishing cuts on steel. Medium shock resistant, medium wear resistant. Contains WC and Co.

44A: (tools and dies) General purpose machining. Best grade with which to start when user is not experienced in machining with carbides. Medium high shock resistant, medium low wear resistant. Used in small standard wire dies. Contains WC and Co.

55A: (tools and dies) Heavy duty, interrupted cuts. Used for machining steel and cast iron parts and in bar and tube drawing dies, tube drawing mandrels, shell dies and percussion tools. High shock resistant, low wear resistant. Contains WC and Co.

779: (dies) Good wear resistant properties. Used where strength is not a factor because of high hardness. Tendency toward brittleness. Contains WC and Co.

120: (tools) Rotary type tools. Contains WC and Co.

55B: (dies) For large draw dies and blanking and piercing operations. Contains WC and Co.

190: (dies) Cold heading operations for rivets, bolts, screws, etc. Most ductile grade and is highly resistant to shock. Toughest available die material. Contains WC and Co.

907: Machining alloy cast irons. Contains WC, Co and TaC.

77B: (tools) Cutting hot welding flash and in hot machining. Contains WC, Co and TaC.

608: Mechanical applications, corrosion and heat resistant. Low density, non-magnetic. Contains Cr₃C₂, Ni and W.

Kennametal Inc.

K3H (91.5 RA) Type A, crater-resistant, general purpose. For moderate cuts on carbon and alloy steels of 0.30 C and above, also for medium to heavy cuts on soft steels with less carbon. Most suitable grade for new high surface speed tooling with mechanically-mounted cutting inserts, high in WTiC₂ for resistance to pick-up or galling.

KM (91.0 RA) Type A, crater-resistant. Stronger than K3H but not as crater-resistant and not as hard. For continuous or interrupted roughing cuts on carbon and alloy steel forgings, bar stock, tubing, etc., of 0.30 C and above, free from scale or sand. High in WTiC₂ for resistance to pick-up or galling.

K5H (93.0 RA) Type A, crater-resistant. Harder and more crater-resistant than K3H, but not as strong. Available in solid tools and inserts for mechanical mounting. For light cuts to precision finishing on clean steel. High in WTiC₂ content, for resistance to pick-up or galling.

K2S (91.5 RA) Type B, crater- and edgewear-resistant. The general purpose grade in this group. High strength and abrasion resistance for roughing steel castings or scaly forgings. Excellent for interrupted cutting with light chip load, as in steel milling. Highly resistant to thermal shock.

K4H (92.0 RA) Type B, crater- and edgewear-resistant. Harder than K2S but similar in characteristics. Resistant to thermal shock. Resists edge wear due to light chip load on steel, as in form tools, large nose radius, or where tool must dwell at end of cut.

K6 (92.0 RA) Type C, edgewear-resistant. The general purpose grade in this group. For roughing to finishing cuts on cast iron and rough to medium cuts on nonferrous alloys of copper, aluminum, magnesium, and titanium, and on Austenitic stainless steel. Also for reaming of steel. Broad scope of application.

K1 (90.0 RA) Type C, edgewear-resistant. Stronger, more shock-resistant than K6 but not as wear-resistant. For very heavy rough cuts on alloy or plain cast iron; as in planers, boring mills, large lathes, etc. Also used on steel where speeds are below desirable range and for heavy cuts on austenitic stainless steel. Extremely resistant to thermal shock.

K8 (92.5 RA) Type C, edgewear-resistant. Harder and more abrasion resistant than K6 but not as strong. For fine finishing of cast iron and light cuts on alloys of copper, aluminum, magnesium, titanium, and non-metals. Used for scrapers on both steel and cast iron. K8 is the most abrasion resistant of all the Kennametal grades.

KE7 (91.5 RA) Type C, special straight tungsten carbide, available only in slender extruded forms of various cross sections primarily for wear-resistant applications.

K82 (90.0 RA) Type D, large content of tungsten titanium carbide, WTiC₂ to resist "galling". For draw die sizes R-17 to R-19.

K84 (91.0 RA) Type D, large content of WTiC₂. For draw die sizes from R-14 to R-16.

K86 (91.5 RA) Type D, large content of WTiC₂. For draw die sizes R-10 to R-12.

K90 (85.0 RA) Type E, tungsten carbide, WC, 25 pct cobalt. For heavy blanking punches and dies, cold-heading dies, nail gripper dies, nibbling dies, and other severe shock applications.

K91 (86.5 RA) Type E, tungsten carbide, WC, 20 pct cobalt. Medium soft grade in high impact group. More wear-resistant than K90, and used for less severe shock applications, as crushing hammers, rivet sets, etc.

K92 (87.5 RA) Type E, tungsten carbide, WC, 16 pct cobalt. More wear-resistant than K90 and K91 with less impact resistance. For lamination punches and dies, heavy forming dies, heavy heading machine hammers, etc.

K94 (90.0 RA) Type E, tungsten carbide, WC, 12 pct cobalt. For light impact work, such as blanking of 0.020 in. steel stock. Also applicable to swaging and rivet heading of non-ferrous metals.

K95 (90.5 RA) Type E, tungsten carbide, WC, 9 pct cobalt. Combines excellent wear resistance with some impact resistance. For blanking of very light ferrous and nonferrous materials, and for light heading hammers.

K96 (92.0 RA) Type E, tungsten carbide, WC, 6 pct cobalt. For very light blanking work, 0.010 in. stock or under, particularly in nonferrous materials, and other applications where simple, sturdy sections requiring great rigidity, and compressive strength, and high wear resistance are needed. Used where shock resistance is not a big factor.

Kentanium Essential ingredient titanium carbide, small percentage of other refractory carbides, such as Ta and Cb, with nickel binder. For high temperature applications beyond the range of conventional metal-cutting carbides 1800° to 3000°F available in several grades, shapes, and forms.

Metal Carbides Corp.

101 For drawing of small gauge non-ferrous wire and liners for sand blast nozzles. RA 93.5.

C-93 For precision boring and finish turning of cast iron, non-ferrous metals and non-metallic materials. Drawing of non-ferrous round bar stock and tubing. RA 92.5.

C-91 For general purpose machining of cast iron and non-ferrous metals. Drawing of non-ferrous shape bars and lighter draws on steel bars and tubing. RA 91.5.

C-89 For heavy duty roughing and interrupted cuts on cast iron and non-ferrous metals. General purpose drawing of steel wire, tubing, bars and shapes. Tipping wear areas on gages, bushings, centers, guides and powder metallurgy dies. RA 90.5.

S-88 For heavy hogging and rough machining of all kinds of steels including cast, forged, rolled, alloy and heat treated. RA 90.0.

S-90 For universal, all-purpose, machining of steels including Monel metal and nickel steels. RA 91.0.

Turn to Page 121

When does it pay to "make your own"?

OXYGEN

In general, if you use
from 300,000 cubic
feet per month to 500
tons (or more!) per day

Steel

Decarburization
Furnace enrichment
Scarfling
Welding and cutting

Chemical

Production of synthesis
gas for

Ammonia
Acetylene
Methanol, Etc.

NITROGEN

If you need large quan-
tities of low-cost, high-
purity nitrogen —

Or, if you use oxygen in
quantity, and also need
nitrogen

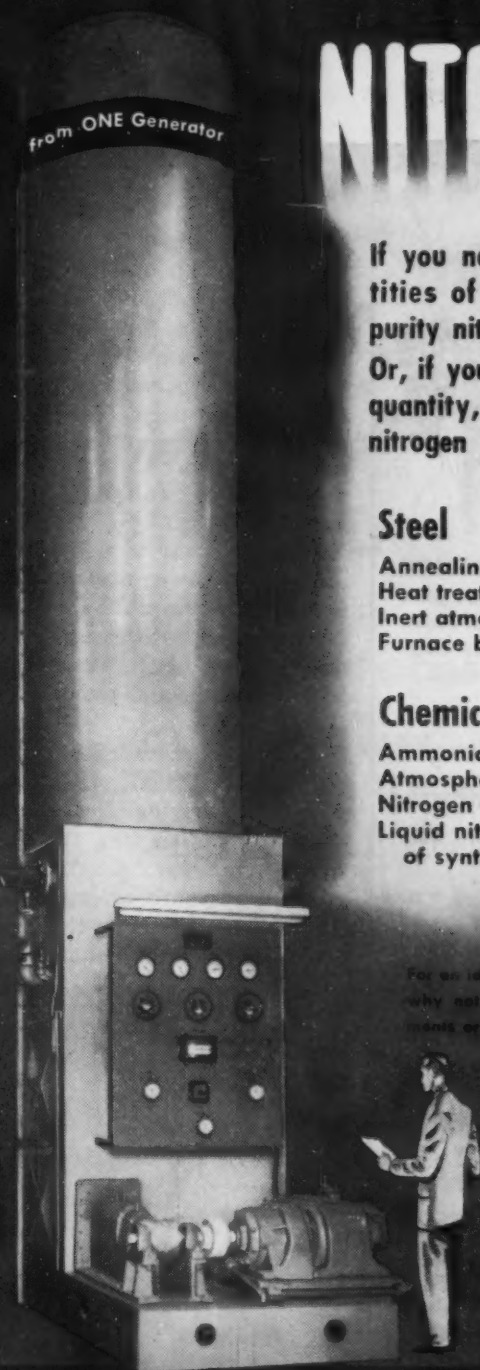
Steel

Annealing
Heat treating
Inert atmospheres
Furnace brazing

Chemical

Ammonia synthesis
Atmosphere control
Nitrogen for drug making
Liquid nitrogen scrubbing
of synthesis gas

from ONE Generator



Whatever your requirements, check with
us! We'll be glad to talk over your
needs . . . help you decide if
"making your own" would be
advantageous.

Possibly one of our 14 standard
High-Purity Oxygen-Nitrogen
Generator models would satisfy
your requirements. Or, perhaps
your interests would indicate an
Air Products Tonnage
Oxygen-Nitrogen plant —
available in 9 standard models,
or built to meet particular
needs.

For an idea of what we can do for you,
why not write us about your require-
ments or problem? We'll send back our
NEW CATALOG, plus
an outline of what
we've done on needs
like yours.

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Air Products
INCORPORATED

High-Purity
and Tonnage

OXYGEN-NITROGEN GENERATORS

Specialists in Equipment for
All Low-Temperature Processes

STEEL PLATE WORK



TURBINE CASINGS

and other heavy steel plate work are fabricated at Pusey-jones of Hot-Rolled, High-Strength, Low-Alloy Steel.

Every facility for large scale metal fabricating: — Heavy plate shop equipment — Rolls — Shears — Bending furnaces. Stress relieving furnace 33'x18'x16' up to 2100°F. Machine shop for facing, turning, and boring. 50 ton capacity gray iron foundry. Deep-water transportation on one side, the Pennsylvania RR on the other. Talk to our development engineers.

Metals Fabrication Division
THE PUSEY AND JONES CORP.
504 Front Street, Wilmington, Del.
Established 1848

PUSEYJONES

Technical Briefs

Engineering

MACHINING:

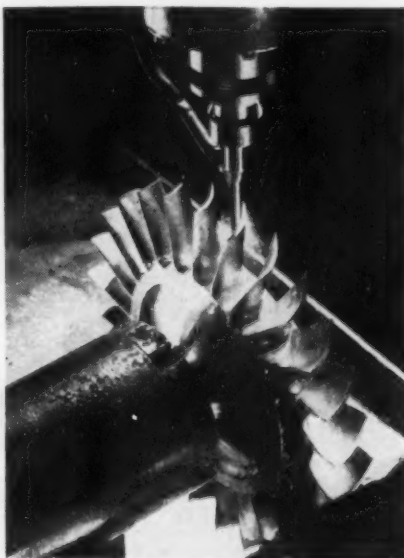
Special milling machine designed to machine rotor blades.

A major problem in machining of rotor blades for a ramjet engine turbine has been solved at Marquardt Aircraft Co., Van Nuys, Calif., by designing a special milling machine for the job.

Marquardt had two problems: (1) Finding an outside manufacturer to do the job. (2) Finding one who could produce to tolerances required for the rotor blades, on a production schedule that matched normal plant output on supersonic ramjet engines.

No Takers—Failing to find an outside company able to do the job, Marquardt went to work and designed its own machine. Rotor blades must be cut to extremely fine tolerances, with varying thickness in each blade, at a specified angle of pitch and twist. No easy assignment.

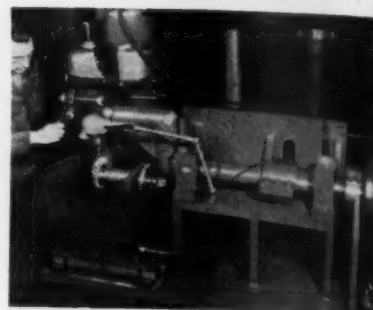
Blades on the rotors must be precision cut, for their job is to act as a turbine driving the spur-gear train mechanism for the ramjet engine governor, alternator, and generator. Another larger set of rotor blades serve as the driving device for the fuel pump.



PRECISION CUT rotor blades are part of turbine drive for ramjet engine governor, alternator and generator. Blades are cut from a turned blank metal piece. Only burring operation is necessary after machining. Air flow surfaces of 10 to 20 rms finishes are held.

IF YOU WANT MORE DATA

You may secure additional information on any item briefed in this section by using the reply card on page 67. Just indicate the subject heading and the page on which it appears. Be sure to note exactly the information wanted.



MILLING MACHINE was designed especially for difficult job of machining ramjet rotor blades at Marquardt Aircraft Co., Van Nuys, Calif.

Cams—The rotor mill designed by Marquardt, utilizes a complicated series of cams and a Fray all-angle cutting head turning at 1800 rpm. Cutting operations so far have been achieved by using end mills and rotary burrs. Materials used for the rotors to date are Chromolly steel and 24ST aluminum.

Rotor blades are cut from a turned blank metal piece. They are machined with such precision that only a burring operation is required before final installation in a ramjet, to produce the necessary finish and tolerance.

Flow—Air flow surfaces of the rotor blades are maintained to approximately 10 to 20 rms finishes.

Marquardt designed their rotor cutting machine out of necessity, to save valuable production time. Cost to produce quality work, and delivery schedule, hold equal values in production. Marquardt couldn't afford to wait, so they did the job themselves.

BEAM-BENDER:

Machine speeds fast, accurate bending of high-strength aluminum.

A special beam-bending machine, designed for accurate and easy bending of new, high-strength aluminum alloy used in aircraft production, has been developed by Lockheed Aircraft Corp. of Burbank, Calif.

Used primarily for bending wing beams but capable of handling other type beams, the new machine can bend 5 x 3½ in. 75ST aluminum alloy beam up to 50° at 325° F. It features rotational control which can be adjusted so that springback does not warp the bent part out of a proper plane.

Two Machines—Only two of the Lockheed-designed machines are in existence, both built by Hufford Machine Works, Inc., in accordance with Lockheed specifications. One machine has been supplied to Beech Aircraft, Wichita, Kan., for use on Lockheed parts built by Beech. The second machine is in use at Lockheed's Burbank plant.

Until the new method was developed by the manufacturing research branch at Lockheed, the bending of beam caps and other extrusions had been accomplished by the use of Cerrobend or by using bend blocks and dies. The advent of 75ST material required hot bending, making previous methods impractical. Lockheed met the challenge with its new machine.

Easy to Operate—Greater efficiency is possible. Jobs which formerly required 30 min are now done in 3—and greater accuracy in bending are being realized through the machine, which requires no special operating skill.

The machine has self-contained hydraulic operating power and incorporates the following features:

(1) Integral heater platens which are automatically regulated for temperature.

(2) Because the amount of

Turn Page



Markal
Paintstiks!

A COMPLETE LINE
for marking
all Types of Surfaces

HOT—COLD—DRY—WET
OILY—ROUGH—SMOOTH

metal . . . glass . . . plastic
wood . . . ceramic . . .
fibre board

You name the material, the surfaces and the conditions under which they are to be marked and you'll find a Markal Paintstik that will efficiently do the job. In those rare cases where conditions are out of the ordinary and no stock Paintstik is available, one will be developed to meet your needs.

Markal Paintstiks are a quality product that produce permanent markings—made especially to meet the needs and special conditions of industry.

Write today for an easy selector chart, then order Paintstiks from your nearest jobber. If he should not have them write direct to the address below.

Markal COMPANY

THE MARK OF QUALITY
MARKAL PAINTSTIKS

3094 WEST CARROLL AVENUE, CHICAGO 12, ILLINOIS

THE *Buy-Law* FOR REFRACTORY PERFORMANCE

- High **S**oftening Point
- High **H**eat Resistance
- High **A**nti-Spalling
- High **M**elting Point
- High **V**olume Stability
- High **A**nti-Slagging

Mullite is the only alumina-silica refractory stable at high temperatures . . . and for mullite the buy-law is **SHAMVA®**

THE MULLITE REFRACTORIES CO.
SHELTON, CONN.

Technical Briefs

springback obtained reflects a difference of $\pm 2^\circ$ F, provisions are made to measure the temperature of the part while it is clamped in the machine.

(3) The jaws accept inserts for adapting to the part cross section, and clamps close the jaws and grip the part tightly.

(4) An equalizer gives symmetrical elevation of the jaws when bending, and there are adjustable centers of motion for each jaw, as well as automatic, adjustable stops for controlling the amount of bend.

(5) There is a provision to rotate the jaws around the beam center line, in order to proportion the dihedral and sweepback angles properly and allow for springback in both planes.

(6) The bend angle can be checked quickly, during the tool try, by opening the clamps and using a template while the part is still in the machine.

(7) The machine can pull backward to correct a beam which is inadvertently overbent during initial adjustment, and it can also remove twist warpage which sometimes occurs in machined or extruded parts.

FLORISTS' WIRE:

Must resist breaking even though bent in intricate designs.

Bridal bouquets, corsages and other floral displays utilize about 8,000 tons of florist wire annually, according to an estimate by one wire manufacturer reported today by American Iron and Steel Institute.

Florist wire is made from low carbon steel, drawn through dies to diameters as small as 0.060 to 0.600 in. The wire is often coated with copper, brass or tin to make a bright surface.

Must Bend—It is heat treated in such a way that the end product can be bent into intricate designs without danger of breaking. Sometimes, florists require florist wire with a green lacquer finish that will be nearly invisible against foliage, stems and ferns.

Turn to Page 116

THE IRON AGE

Now . . . 2 New AO COVERGLAS GOGGLES

Fit Over Safety And Personal Glasses



#326

NEW - 4 WAYS!

1. New Cup Size and Shape
2. New Lens Size and Shape
3. New Side Shields
4. New Easy Lens Replacement



#327

QUICK FACTS

- Lens easily replaceable from rear (not front) by means of a spring clamp—no tools needed
- Lightweight, brown plastic cups fit face snugly, won't conduct heat or electricity
- Light-tight side shields for welders (on No. 327 goggle) provide indirect ventilation
- Bridge—High-grade leather. Instant adjustment
- AO worker-lab tests show much greater field of vision and increased comfort
- All-rubber headband, easily adjustable
- "326" Chippers' Coverglas goggle supplied with regular Super Armorplate lenses. "327" Welders' Coverglas goggle supplied with regular Noviweld lenses and cover lenses.

AO's Industrial Vision Program Increases Production, Decreases Accidents. Write today for booklet "Improved Industrial Vision" to 1011 Vision Park, Southbridge, Mass.

AO's newest development in eye protection—Chippers' and Welders' Coverglas Goggles—can be worn over practically every pair of personal glasses (even the biggest frames) and most types of safety prescription goggles *with and without side shield*.

Wider vision, too, because the lenses are larger and scientifically designed to give up to 20% more vision. Yet, with all these features the goggles weigh but a fraction of an ounce more than ordinary Coverglas goggles . . . cost only slightly more.

These goggles are the newest . . . and two of the greatest . . . developments since the advent of safety goggles. Get all the facts about these two outstanding Coverglas goggles from your AO Safety Products Representative. He can supply you.

American Optical
COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

JOHNSON



HIGH QUALITY HIGH CARBON WIRE

When the second man appeared on earth, the rights of the first were cut in half. Now divide yourself by the total population and that explains everything.

We do not claim the know-all of the wire making business, but we have been associated long with the men of this great wire making "center"—and from many of these wire men have come suggestions that have led to improvements in manufacture all the way from rod to finished product.

**Worcester is the cradle of the American wire drawing industry.*

JOHNSON STEEL AND WIRE COMPANY, INC.

WORCESTER 1, MASS.

New York Philadelphia Cleveland Detroit Akron Chicago
Atlanta Houston Tulsa Los Angeles Toronto



SUBSIDIARY OF PITTSBURGH STEEL COMPANY

—Technical Briefs—

CLEANING CASTINGS:

Airless blasting speeds cleaning of steel castings.

Airless blasting for cleaning very heavy steel castings has made it possible to reduce overall cleaning costs 50 pct at Electric Steel Castings Co., Indianapolis, Ind.

Two hundred tons of castings per month weighing up to 3000 lb each, are cleaned in a swing table cabinet manufactured by American Wheelabrator & Equipment Corp., 1145 S. Byrkit St., Mishawaka, Ind. Since castings are cleaned in the green stage and after annealing, the total cleaning production is 400 tons per month.

Rotates—The machine has a rotating table 86 in. in diam mounted on the cabinet door for easy loading and unloading.

When the door of the machine is opened the table automatically comes out into the room for loading or unloading. When the door is closed, the table moves into the cabinet, where it rotates the cast-



TYPICAL TABLE loads of steel castings cleaned on 86-in. rotating swing table machine set up at Electric Steel Castings Co.



When door of machine is opened table automatically moves out into the room for loading or unloading.

Turn to Page 118



"Life Line"

of the Steel Industry

Helping move iron and steel from storage yard—to gondola car—to steel mill—to fabricator and end user—is just one of the many jobs McKAY CHAIN does better and more economically.

If your problem involves hoisting, hauling, bundling, and other material handling jobs of lifting, moving or anchoring the smallest to the heaviest loads, you can be sure there is a McKAY CHAIN to do the job efficiently and at low cost. Your inquiry will receive prompt attention.

McKAY CHAIN

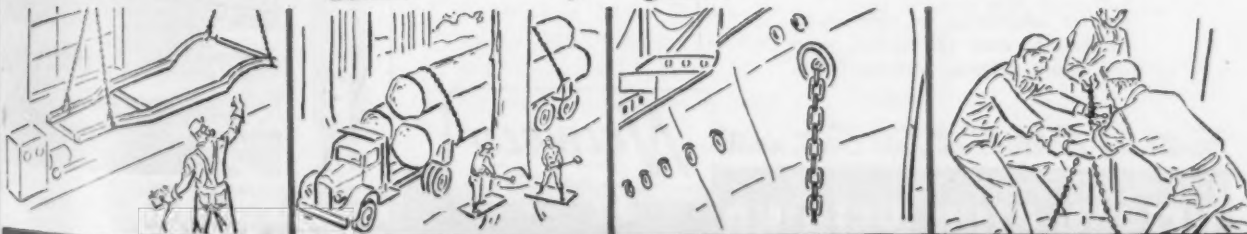
for Every Use

McKAY CHAIN BULLETINS


- McK-Alloy Sling Chains • Tractor-Truck Chains
- General Purpose Chains • Oil Field Chains

Write for the Bulletins you need.

McKAY — *A good name for good chain* — **Since 1881**



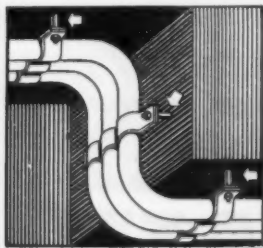
The McKAY Company • 447 McKay Building • Pittsburgh 22, Pennsylvania

 END-WELDS STUDS TO STEEL IN A SPLIT-SECOND	 ELIMINATES DRILLING, TAPPING, HAND WELDING	 REDUCES MATERIAL HANDLING—TAKES THE TOOL TO THE WORK
 SAVES STEEL—ELIMINATES HEAVY BOSSES AND FLANGES	 SAVES STEEL—ELIMINATES HEAVY BOSSES AND FLANGES	 IMPROVES PRODUCT DESIGN AND QUALITY

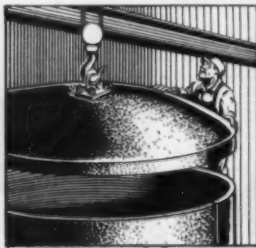
TAKE ADVANTAGE OF NELWELD COST SAVINGS IN STEEL FABRICATION

TO HANG....TO HANDLE....TO HOLD..

Faster installation of brackets or hangers for piping, tubing or conduit.



Fast installation of handling accessories that can be easily removed.



Split second stud welding lowers fabrication costs, improves product.



THE NELSON FASTENING ENGINEER WILL SHOW YOU



...right in your own plant how your production and your products can be improved with this modern fastening method. Your design and production men can actually participate and test the results on your own products.

For full information on Nelweld as applied to steel fabrication, write the Main Office, Lorain, Ohio.

Faster at Better...at Less Cost, with

NELSON STUD WELDING

DIVISION OF GREGORY INDUSTRIES, INC., LORAIN, OHIO



—Technical Briefs—

ings under the blast of metallic abrasive from three rotating bladed wheels mounted in the cabinet roof and walls.

Faster — Cleaning time for an average table load of green castings with a heavy accumulation of sand is 5 min. The annealed castings are cleaned of their scale in 2 min. All cleaning is now handled in one 8-hr shift.

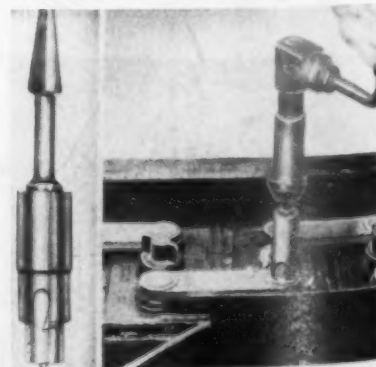
Metallic abrasive is used over and over. After striking the castings, abrasive particles fall down into a pit below the machine, where they are moved by a screw conveyor into an elevator. The abrasive elevator carries them up to the top of the machine, where abrasive is separated from the sand and casting scale.

MAINTENANCE:

Industrial truck battery simplified with special drill

In maintenance of industrial truck storage batteries it is often necessary to remove the battery cover for cell replacement or element repair. A special drill developed by the Service Department of Gould-National Batteries, Inc. has simplified the process.

Rubber-jar batteries have post openings lined with lead inserts integral with the hard rubber cover. These lead insert linings are welded to the lead battery posts to prevent leaks and it is necessary to drill out gaps between posts and inserts in order to remove a damaged cover.



DRILLING annular hole with special tool, left, permits battery cell connectors and jar covers to be removed without disturbing terminal post.

Turn to Page 120

Announcing



CONTINUOUS STRIP PICKLING LINE

NEW • EFFICIENT • ECONOMICAL

Complete line equipment with latest improved operating features.
Maximum volume production with minimum floor space requirements.

If you are interested in a new installation or improving your present equipment why not investigate the Youngstown Line!

These features

- ☐ Coil Box with Strip Opener.
- ☐ Triple Processor with Roller Leveller.
- ☐ Flash Welding and Mechanical Stitching.
- ☐ Single Cycle Up-Cut Shears.
- ☐ Heavy Duty Rubber Covered, Brick Lined Steel Tanks.
- ☐ Magnetic Loop Control for Acid Tanks.
- ☐ Fume Exhaust System—Roto Clone Scrubber.
- ☐ Automatic Control System for Temperature and Acid Proportioning.
- ☐ Side Trimmer with Scrap Cutting or Baling.
- ☐ Up-Coiler with Strip Oiling System.
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The DUALOC Ending produces the strongest wire rope sling made. Two collars insure uniform strength from sling to sling. Actual strength certified by warranty certificate. Preformed improved plow steel Green Strand wire rope with steel core assures maximum resistance to kinking.

Popular sizes in stock for immediate delivery.

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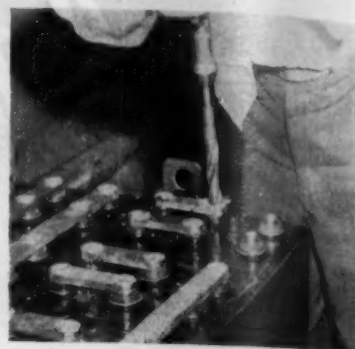


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AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles,
New York, Odessa, Tex., Philadelphia, Pittsburgh,
San Francisco, Bridgeport, Conn.

Registered
Wire Rope
Slings

Technical Briefs

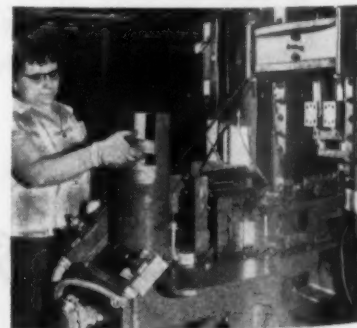


ALTERNATE method of drilling battery posts permits removal of a damaged cover. A 15/16-in. drill is used.

Cut Out—The new drill cuts an annular hole and permits the lead posts to remain solid, upright and of normal height after the cell connector and the jar cover have been separated.

Repairs may also be made by drilling the posts in the damaged cover to a depth of 3/8 in. using a 15/16-in. drill. This frees the intercell connector. Drilling may then be continued through the cover to free it in turn. This latter technique requires rebuilding the posts before reassembly in a new cover to replace the broken one.

Puddling — Such rebuilding is done by a simple lead "puddling," applying heat by a carbon electrode manipulated within the cavity of a simple post mold.



ROTOR MILL utilizes series of special cams and a Fray all-angle cutting head turning at 1800 rpm to cut ramjet rotor blades. Rotor and stator laminations for industrial fractional horsepower motors are punched out at a rate of 135 strokes a minute on this magnetic-feed punch press at the Westinghouse Small Motor Div., Lima, Ohio. Blanks are stacked by hand on a vertical indexing feeder, then picked off with magnets, placed in position, stamped, and hustled out of the way by a powered device.

—Directory of Carbides—

Continued from Page 110

S-92 For light, high speed precision boring and fine finishing of steels at high speeds. RA 92.0.

C-88 For light extrusion and swaging operations under average conditions. Tipping wear areas on tube drawing mandrels, centerless grinder blades, core rods and draw punches. RA 89.0.

S-8515 For heavier and more severe extrusion and swaging operations. Lighter cold heading and hammering applications in the bolt industry. RA 87.5.

C-8020 For general purpose use in cold heading dies, heading hammers, cut-off quills, shearing knives and lamination punch, die inserts. RA 86.0.

C-7525 For heavy duty and extra-severe cold heading, shearing and metal forming operations. Punch and die inserts for perforating and slotting heavy gage sheetmetal. RA 84.0.

Tungsten Alloy Mfg. Co., Inc.

9 For roughing cuts for cast iron and nonferrous materials; for small wire drawing dies; and for wear surface where there is slight shock.

9H A hard general purpose tool grade for cast iron and nonferrous metals. Will not stand impact as well as 9 but will give more wear. Also well adapted to drawing copper.

9C Harder than 9-H; designed particularly for light finishing cast iron and nonferrous materials.

9B The hardest tungsten alloy carbide made; will not stand impact, but excellent for precision finishing work and precision boring of cast iron and nonferrous metals.

9R A tough grade, designed particularly for rough cutting steel.

9G The tungsten alloy general purpose steel cutting grade.

9F The hardest tungsten alloy steel grade; for finishing cuts.

9M An intermediate grade for medium size steel dies, and wear applications subject to light shock.

9A A tougher metal, not so hard as 9 and 9M, especially suited for larger wire and tube drawing dies, and wear applications subject to fairly heavy shock.

9A15 A tough material suitable for impact applications, where the impact is light. For blanking dies and punches, etc.

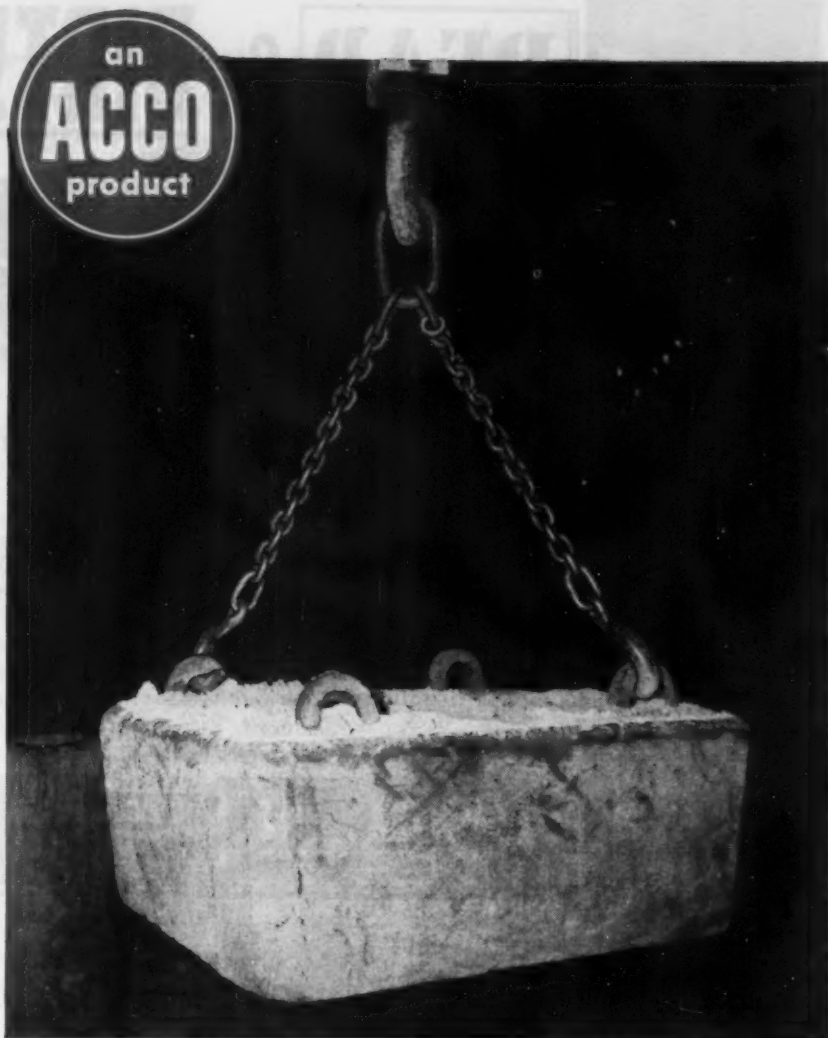
9A20, 9A25 These grades are recommended for heading dies and where toughness rather than hardness is the essential quality; 9A20 for medium heavy impact, and 9A25 for heavy impact duty.

Wiley's Carbide Tool Co.

509 For precision turning and boring and high speed finishing cuts in steel to close tolerances. Has higher wear resistance than 606, but less resistance to shock.

606 For light roughing and finishing. High abrasion resistance plus sufficient toughness for finishing practically all types of steel.

Turn Page



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• One rigger said: "It's a neat factory-made unit that we know is made properly." A foreman said: "My men look for the identification ring. It's sort of a safety indicator."

Every ACCO Registered Sling Chain is built and tested as a unit and bears the ACCO identification ring. The sling illustrated above has ACCO Foundry Hooks designed for use on casting molds which get very hot. It is engineered for this particular job and will give long service. It is one of the many types of Registered Sling Chain made by AMERICAN to handle safely all kinds of lifting jobs.

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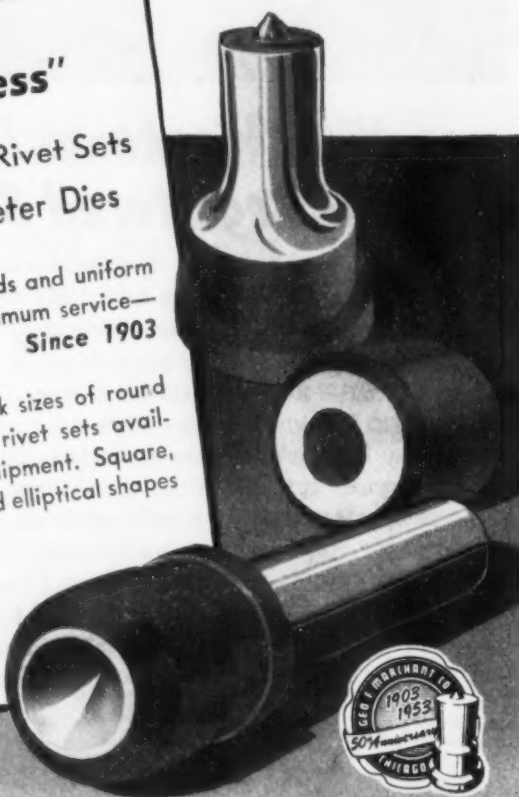
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—Directory of Carbides—

Continued

710 For general purpose steel machining. A tough, wear resistant grade that handles most types of steel, including Monel Metal and Nickel steels.
945 For machining steel on heavy duty machines. Has less wear resistance than other grades, but is tougher, with high shock resistance.
E-3 For precision finishing operations, including the finishing of centrifugal cast iron and alloy irons. Has very high wear resistance.

E-5 The ideal grade for finish turning and boring of cast iron, nonferrous metals and non-metallics. Keeps a good cutting edge, for finishing long runs at close tolerances. Handles light cuts on alloy cast iron up to 550 Bhn.

E-6 An all-purpose grade for roughing and semi-finishing of cast iron, nonferrous metals and non-metallics.

E-8 Ideal for heavy, interrupted cuts and all types of machining of cast iron, nonferrous metals and non-metallics. Tougher than E-6, but slightly less resistant to wear. A general purpose grade.

E-73 For heavy cuts of cast iron, nonferrous and non-metallics with slow speeds and heavy feeds. Very tough, and shock resistant. Used principally for wear surfaces.

E-18 A medium impact carbide for header and extrusion dies.

E-25 For heavy impact in blanking and forming dies.

Vascoley Ramet Corp.

2A3 For heavy roughing of cast iron, nonferrous metals, and non-metallic materials. Excellent resistance to shock with fair resistance to wear. Contains WC plus Co.

2A68 For roughing of cast iron, nonferrous metals, and non-metallic materials. Good resistance to both shock and wear. Contains WC plus Co.

2A5 For general purpose machining of cast iron, nonferrous metals, and non-metallic materials, slightly less resistant to shock and slightly more wear resistant than Vascoley 2A68. Contains WC plus Co.

2A7 For finishing cast iron, nonferrous metals and non-metallic materials. Fair resistance to shock and excellent resistance to wear. Contains WC plus Co.

AW For very heavy roughing of steel. Excellent resistance to shock with fair resistance to wear. Contains WC, TaC and Co.

EE For heavy roughing of steel. Slightly less shock resistant, but much more wear resistant than Vascoley-Ramet AW. Contains WC, WTiC₂ and Co.

EI For general purpose machining of steel. Good resistance to shock and wear. Contains WC, WTiC₂, Co.

E For finishing steel. Very good resistance to wear, with fair resistance to shock. Contains WC, WTiC₂, Co.

EH For light finishing and boring steel. Excellent wear resistance, but less shock resistance than Vascoley E.

Booming Demand May Embarrass Market Prophets

Good business had been predicted, but this market is a real bull . . . Biggest capacity will help meet unexpected demand . . . Ingot rate estimated at 98.5 for this week.

Steel business is booming at such a lusty pace there is a good chance it will confound the experts. Although most forecasters predicted a good first half for the steel industry, there is growing evidence that many of them will be surprised at the actual strength and duration of demand.

This week the market is surging and boiling with pressure from a thousand sources. Instead of showing expected signs of abating, demand is fully as strong as it has been for many months. Moreover, business optimism is snowballing. This spells continued strength in the steel market for the months ahead. Higher production targets of steel users are bound to be reflected (perhaps even magnified) in the steel market.

Wave of Optimism—The business world seems on the verge of being engulfed by a tidal wave of optimism. Some in the steel industry now believe its momentum will carry high levels of demand and production well into the second half. Others recall that inventory correction has in the past reversed the steel market with amazing suddenness. They caution that it will be well to watch the rate of new orders and cancellations in the months ahead.

On the basis of a careful check by THE IRON AGE this week, there is no reason to sell steel demand short for at least the next six months—perhaps longer. If steel business is headed for a decline in the second half, telltale signs should be evident by the second quarter. No such signs are evident now.

Market Dope—In a nutshell here is how the market looks this week:

(1) Products remain about uniformly tight with exception of some wire products and some limited-tonnage specialties. (2) Consumers still want to place orders for more tonnage than they have tickets, or than mills can accept. (3) Cancellations are not now a factor. (4) Unexpected pressure is coming from civilian customers; not military. (The military seem satisfied with their approximately 12 pct of total steel output.) (5) Good order books of nonintegrated and premium priced producers indicate the high business level is spread over a broad base. (6) Conversion demand remains strong.

Other Factors—Adding to the bull market, are a number of expanded civilian programs which have not yet begun to be felt. Heading this list are the forecast for the greatest road and bridge building programs in history; more schools, churches, and hospitals; a revived freight car building program, and many other civilian projects which had been held in check by controls.

Partly offsetting this, steel delivery for military and industrial construction is over the hump. And all military deliveries delayed by the 54-day strike last summer have been made up, so that the military take has dropped back to its current programmed share.

New Capacity—To satisfy demands of all steel users as rapidly as possible, the steel industry will exert the full force of its expanded capacity—the greatest in history. At the beginning of 1953 capacity of the industry is officially rated

at 117.5 million net tons per year. Almost 9 million tons of new capacity were added during 1952.

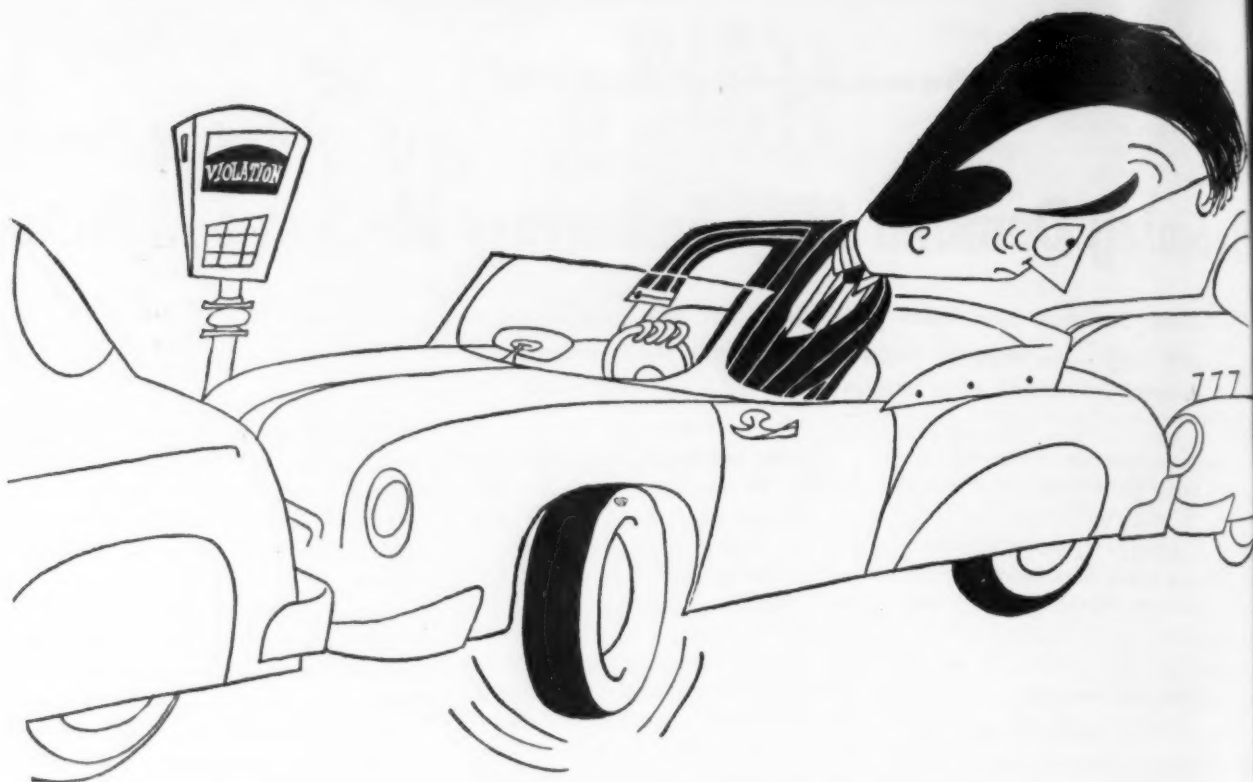
Based on the new, higher capacity, steelmaking operations this week are scheduled at 98.5 pct. On the old capacity basis the rate this week would have been 106.5 pct, half a point less than last week.

Ace-in-the-Hole — Production rates far above 100 pct of capacity do not seem likely—at least until some of the 4 million tons of additional capacity expected to be added this year has been completed. Production at even 100 pct of the new capacity rating for the industry would yield a new record for tonnage produced in 1 week.

Greatly increased capacity is the ace-in-the-hole steel people are counting on to help free them from the controls yoke. They estimate that they will be able to produce 118.8 million net tons of steel this year—if needed. But they doubt that consumers can long digest steel at that rate.

Inventories—If steel inventories are growing appreciably, there is little evidence of it. In times of shortage consumers are inclined to conceal their inventory—unless they have none. Inventories at least seem to be reaching a more workable balance. This is evidenced by the decreasing number of emergency calls for spot tonnage of critical items (almost regardless of cost). There are also some indications that buyers are giving more attention to quality. This is usually interpreted as a sign that they are not desperate.

Warehouse inventories are continuing the long, slow climb back from near-oblivion which resulted from the strike. One warehouse chain expects a 3 pct inventory gain this month, even though it opened a new outlet.



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Market Briefs and Bulletins

Structurals—Producers of fabricated structural steel expect to increase substantially shipments from their plants in 1953. Preliminary report of the American Institute of Steel Construction places total shipments of fabricated structural steel for 1952 at 2,615,000 tons as compared with 2,702,000 in 1951, the peak year since 1930. An estimated 200,000 tons of shipments were lost last year because of the steel strike.

Dominion Steel Prospects—Canada is set for a sharp increase in iron and steel production this year, but shortages will continue in some steel lines until the middle of 1953. Cold rolled steel will remain tight for a few months due to insufficient processing equipment. This situation cannot be remedied until the end of the first quarter. Serious shortage of galvanized sheets is not expected to be relieved before July. Easing of hot rolled mill products is expected to continue.

Less Freight—Loading of revenue freight on U. S. railroads totaled 37,983,428 cars last year, reports Assn. of American Railroads. This was a drop of 2,515,754 cars or 6.2 pct compared with 1951. Ore loadings were off 11.7 pct. as compared with 1951 while coal shipments dipped 10.4 pct.

Case Settled—Settlement of the Williamsport Wire Rope Co. litigation has been approved by the Court. Under provisions of the judgment, Bethlehem Steel Co. will pay \$6 million into the Court for distribution to stockholders and former stockholders of Williamsport Wire Rope Co.

More Appliances—Hotpoint Co., Chicago, hopes to increase its appliance sales 25 pct in 1953 and by 1960 anticipates that some lines will be selling at six times the current pace. Company spokesman says Hotpoint purchased \$33 million worth of production materials in 1952 and believes this figure will reach \$108 million in 7 years.

Air Minded—Aircraft business became the dominant industry in the three West Coast states during 1952. Aircraft payrolls in Los Angeles and San Diego hit 200,000, or one-third the total U. S. aircraft employment. In Seattle, four out of ten workers were employed by Boeing or its suppliers. Around the Los Angeles area 25 pct of all workers were in the aircraft industry and the figure hit 75 pct for San Diego.

Pig Higher—Mystic Iron Works, Everett, Mass., has revised its pig iron prices for the first quarter. New prices are 25¢ a ton higher. No. 2 foundry iron is now listed at \$59.50 and malleable at \$60 per gross ton.

GM Production—During 1952 General Motors produced 2,256,513 passenger cars and trucks. Production in 1951 totaled 2,815,248. Of the output reported for 1952, 1,801,457 were passenger cars.

Canadian Steel—Some Canadian steel production and casting data were omitted on p. 403 of the Jan. 1 issue of THE IRON AGE. The 1952 estimate for steel ingots and casting output is 3,710,854 net tons. Production of an estimated 3,583,394 ingot tons on a capacity of 3,630,900 tons gives an estimated rate of 98.6 pct of rated capacity.

STEEL OPERATIONS

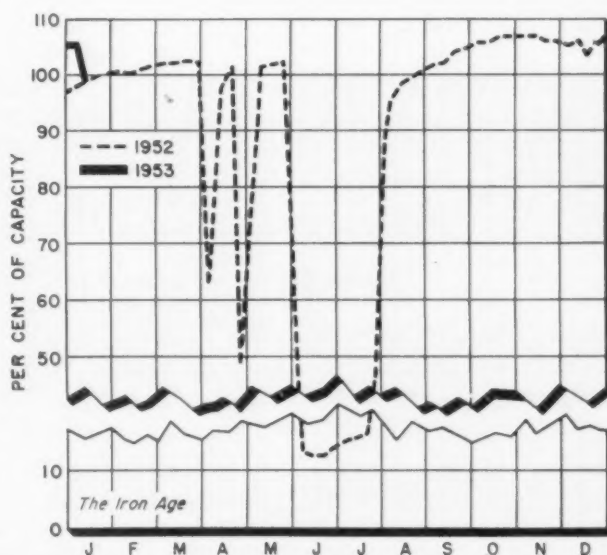


District Operating Rates

District	Week of Jan. 4	Week of Dec. 28
Pittsburgh	99.5	107.0*
Chicago	99.0	106.0*
Valley	97.5	104.0*
Philadelphia	95.5	100.5
West	99.5	104.0*
Buffalo	100.0	106.5
Cleveland	98.5	87.5*
Detroit	99.0	107.0*
Wheeling	98.0	101.0
Birmingham		
(South)	100.0	107.5
South Ohio River	93.0	71.0
St. Louis	93.0	101.5
East	93.0	82.5
Aggregate	98.5	107.0*

Beginning Jan. 1, 1953, operations are based on annual capacity of 108,587,670 net tons.

* Revised



Nonferrous Markets

Zinc Trade Starts On London Market

Producers in U. S. greatly relieved at London prices . . . St. Louis zinc price hiked 1/2¢ to 13¢ as soon as news reaches this side . . . Alcoa turns down price hike—By R. L. Hatschek.

People in the zinc trade have started to breathe again. They'd been holding their breaths, of course, in anticipation of private zinc trading on the London Metal Exchange. It started last Friday.

At least the initial breath was a sigh of relief as prices settled at the end of the first day's trading at a New York equivalent of 13.09¢ per lb for prompt zinc. First session prices had been higher, equivalent to 13.34¢ delivered New York for prompt. This news was followed shortly by an increase in the St. Louis quotation to 13.00¢ per lb, up 1/2¢ from the level that had held steadily since Oct. 23.

Now Dependent—From here on the domestic zinc market will again be the twin of the lead market—no longer its own boss. As with lead, zinc prices will be determined across the Atlantic, fluctuating with occurrences that seem totally disconnected with U. S. supply and demand.

The recent hikes in lead, for instance, resulted from higher prices in London. These, in turn, were the result of a work stoppage down under in Australia.

"Junior" Firm Power—Signs of the times may be found anywhere. Latest is in the allocation of electrical power for the proposed Har-

MONTHLY AVERAGE PRICES

The average prices of the major non-ferrous metals in December based on quotations appearing in THE IRON AGE were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley . . .	24.50
Lake Copper, delivered	24.625
Straits tin, New York	\$1.2147
Zinc, East St. Louis	12.50
Zinc, New York	13.33
Lead, St. Louis	13.925
Lead, New York	14.125

vey Machine Co. aluminum smelter in the Northwest. Starting July 1, 1954, the company will get from Bonneville Power Administration 40,000 kw of firm power, 20,000 kw of "junior" firm power, and 60,000 kw of interruptible power.

The quotation marks around junior belong to Defense Production Administration. It probably would have been better to call it 'junior "firm" power.' It's the juice that gets cut as soon as all interruptible has been sliced off.

36,000 Tons To Go—The 54,000-ton plant, to be built at The Dalles, Ore., will make Harvey the sixth aluminum producer in the U. S. and brings the government's third round expansion for the industry to 164,000 tons, short 36,000

tons from the goal. Total capacity of facilities now operating, being built, or in the planning stage now reaches an ultimate smelting ability of 1,694,450 tons a year.

Harvey's certificate of necessity covers facilities estimated to cost \$65,250,000, with 85 pct allowed for fast tax write-off. The whole job is to be carried by private finance.

Turned Down—Biggest of aluminum's Big Three, Aluminum Co. of America, turned down the government's offer of a 1/2¢ increase in primary pig and ingot prices, terming it "entirely unsatisfactory." A 4 pct hike for finished and fabricated forms went with the government offer. The company wants what the industry asked for last summer, 1¢ on metal, 5 pct on finished and fabricated forms.

Office of Defense Mobilization wanted a revision of aluminum supply contracts between the government and aluminum producers. The ODM proposal would obligate suppliers to maintain full production at plants coming in under expansion since Korea. The government would buy all unsold metal, guaranteeing at least a 2¢ per lb profit margin in contracts with producers.

Copper Ratio—National Production Authority final figures for the second half of 1952 shows just how sour the proposed 60-40 ratio worked out in copper. Net allocations for the brass mills turned out to be 55 pct domestic and 45 pct foreign in the third quarter, and 57 pct domestic, 43 pct foreign in the fourth. Copper wire mills did a bit better in the third quarter, 56-44, and got the same 57-43 ratio in the fourth.

Washington officials claimed the changes were accounted for not only by a decline in domestic production, but also a "willingness of the mills to purchase the higher priced foreign copper." Sure they were "willing to pay" — they needed copper.

NONFERROUS METAL PRICES

	Dec. 31	Jan. 1	Jan. 2	Jan. 3	Jan. 5	Jan. 6
Copper, electro, Conn.	24.50	....	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	....	24.625	24.625	24.625	24.625
Tin, Straits, New York	\$1.21 1/2	....	\$1.21 1/2	....	\$1.21 1/2	\$1.21 1/2*
Zinc, East St. Louis	12.50	....	13.00	13.00	13.00	13.00
Lead, St. Louis	14.55	14.55	14.55	14.55	14.55

Note: Quotations are going prices.

*Tentative

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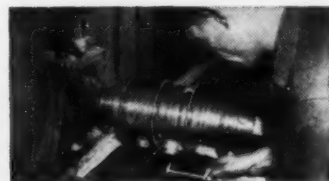
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Iron and Steel Scrap Markets

Market Yawning Off Holiday Lull

Starts to snap back to normal . . . Holidays take some toll on mill inventories . . . Some mills may coast along at less than consumption receipts . . . Detroit sees brisk trading.

With scrap industry men setting their houses in order in preparation to leaving for the Institute of Scrap Iron & Steel's New York City convention next week, the market yawned off the holiday lull and was starting to return to normal.

It was certain that inventories of some mills had been whittled down a trifle during the holidays. Question posed in Pittsburgh was whether some mills would permit high inventories to slide further. For some mills with supplies on hand approaching 90 days it seemed safe to do so.

But for other mills the New Year may well prompt new buying interest. Thus far winter had dealt no savage blows at the scrap collection network. Scrap can be urged out in good quantities until the ice really begins to close in.

In Detroit post-holiday buying was expected to be brisk while demand continued sound for openhearth and electric furnace grades. The largest buyer in the Birmingham district entered the market again on Jan. 2 and the second largest was in the market. Chicago outlook for openhearth grades remained potent.

Pittsburgh—A gradual decline of scrap inventories appears to be in prospect. Some mills apparently have concluded that with stocks at a high level they can afford to limit incoming shipments to a less-than-consumption basis. It was believed that inventories in this district might be permitted to decline to about 60 days but certainly not below that point. Some consumers now have about 90 days supply.

Chicago—Outlook for openhearth grades remains good with this material moving well at all levels. No brokers were eager to quote long range prices on other grades, however, and electric furnace was sub-

ject to some downgrading. Cast was plagued by the holidays and sales were negligible, with nominal prices still sliding. There were reports that heavy melting was taking on a mixed character. This could not be confirmed. Dealers' yards were reported low in scrap, with movement still off noticeably. Electric furnace grades, despite the downgrading, are regarded as fairly stable at present.

Philadelphia—Yards were getting back to normal early this week—but slowly. Not much material is coming in with the exception of light iron. Electric furnace grades are moving along but there's no excitement in this market since mill stocks are reported good. Some feeling exists that cast prices may go lower but this is disputed.

New York—The market here was shaking off the holiday doldrums. Demand for openhearth grades stayed potent. Generally mill demand had not yet pushed past the December rate of interest but it was hoped that more interest would be generated. At the broker level more activity was reported—as if preparations were being made for more sales ahead.

Detroit—Scrap activity slowed to a walk during the holidays, a fact that did nothing to aid generally low inventories here. Post-holiday buying is expected to be brisk. Demand is still very good for openhearth and electric furnace grades. In a little better position than a month ago, electric mills are tightening inspection although still not up to strictest standards.

Cleveland—Scrap is now being released in greater volume by Cleveland and Valley mills. With inventories in better balance and continued pressure on better grades of scrap, most consumers would like to see more scrap moving into the area. Lean yard supply and fairly large amount of "paper" scrap on books is causing some concern as shipments

ease. There is free movement of most grades with the exception of malleable. Electric furnace is still in short supply.

Birmingham—The largest buyer of steel scrap in the district went back into the market on Jan. 2 for limited quantities of most grades. The second largest buyer also was in the market. They insisted, however, on 80,000-ton shipments in order to obtain the lowest possible freight rate. Some shipments still were going north. Brokers said that although dealers' stocks are low, they still are able to fill orders. One large cast scrap buyer in Chattanooga is offering \$44 for No. 1 cast for 30 days delivery.

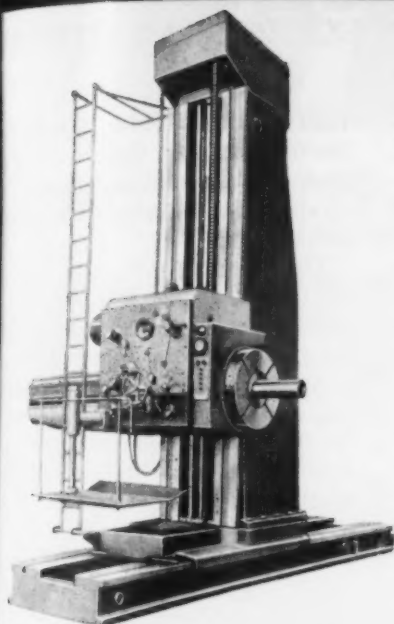
Cincinnati—Bad weather hasn't affected shipments so far. Most mills are slowly coming back into the market as present plans call for balancing consumption and purchased scrap. One large mill has reduced its inventory to the 30-day level and plans to mark time until it can put a new blast furnace into operation around Mar. 1. Borings and turnings are moving freely but cast is slow. Demand for industrial and railroad scrap is good.

St. Louis—Practice of steel mills of giving a broker another order for melting grades upon the fulfillment of one continues over into 1953, which finds the mills "comfortably fixed" with inventories. Movement to this district has been slow for some time and bad weather conditions will halt collections. Rails of all kinds are in strong demand.

Boston—Following the usual Christmas and New Year's slackening the scrap market in New England got back to normal this week—except for cast. Previously slow, there has been even further slackening in demand for mixed cupola and stove plate. Almost no demand exists for these grades. But heavy breakable is 50¢ to \$1 higher, quoted at \$40 to \$40.50 per gross ton.

Buffalo—The scrap market started 1953 on bullish note as one of leading mill consumers placed new orders for approximately 15 to 20 thousand tons at ceiling levels. In addition another mill lifted a 3-month embargo on shipments from dealers. About 18,000 tons have accumulated for the mill during the embargo period.

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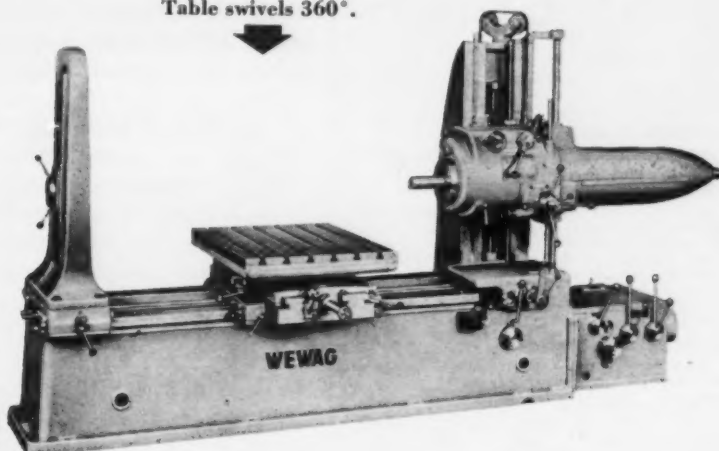
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NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Not Worried—Despite the tailing off of business near the end of 1952, many used machinery dealers in the Chicago area anticipate a good year in 1953. Used tool men admit last year wasn't as strong as 1951 but they still enjoyed much better than average business. As a result, most dealers believe sales can't plummet to pre-Korean levels unless the market drops abnormally.

Indicative of dealer optimism in Chicago are recent attempts to build up inventories. The possibility of buying in a comparatively high market and then being caught if the market drops is one problem dealers aren't too worried about. They are operating on the logical belief that you have to have tools if you want to sell them. And since dealers' inventories need bolstering in a number of lines, they're out to get what they need. Competition is expected to stiffen.

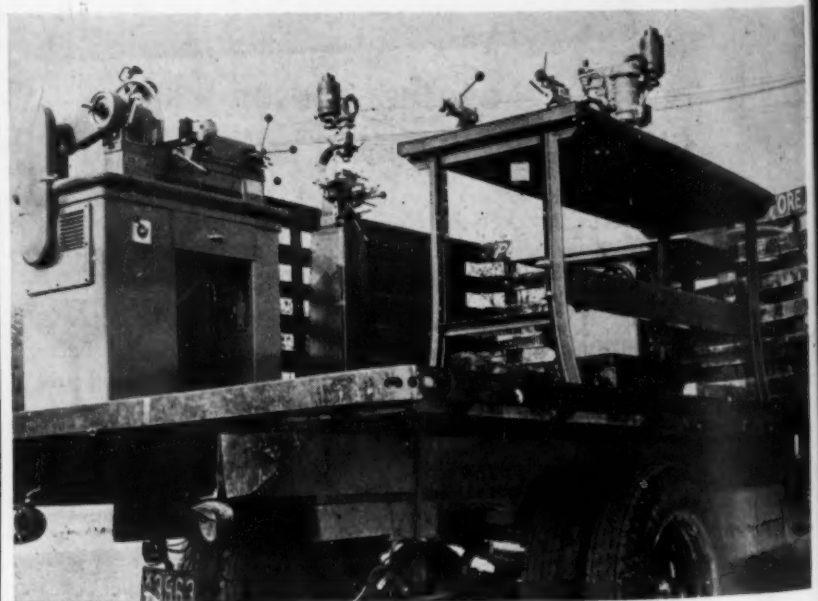
Must Specify—Foreign equipment sales have not been strong around Chicago. Several agencies carrying heavy foreign production

tools no longer order them as on-the-floor items. Orders for this type of equipment are placed only if specifically requested by a customer.

Out-of-area sales are holding well, with dealers reporting shipments to both coasts. Most of this business is being handled by local dealers. Instead of having the customer deal directly with a Midwestern used tool supplier, the orders are placed by seaboard dealers.

Small Buyers—One trend previously reported from the Chicago market continues. Small buyers are still showing interest in used tools. They make a lot of inquiries, look over a lot of machinery but keep a sharp eye on price tags and take older equipment when prices on newer units seem too high. Interest in grinding and milling machines is particularly firm.

Trade between dealers is reported active. Small presses have been moving well but demand for tool and die working machines has not been as strong.



EAGER COMPETITOR: Indicative of the aggressive and enterprising sales approach employed to push foreign machinery is the traveling machinery showroom used by Eric R. Bachmann, New York. A cross-section assortment of machine tools is loaded on a truck and delivered to the prospect's door for inspection. Because of the convenience and time saved, customer reaction to this door-to-door sales technique is reported as favorable.